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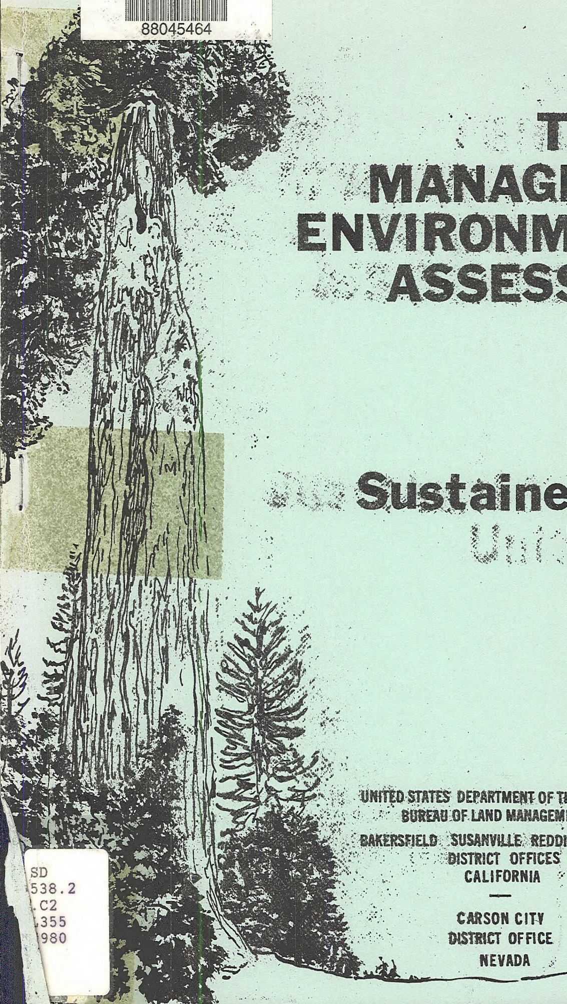

FINAL TIMBER MANAGEMENT ENVIRONMENTAL ASSESSMENT

Sustained Yield Unit 15

UNITED STATES DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
BAKERSFIELD SUSANVILLE REDDING FOLSOM
DISTRICT OFFICES
CALIFORNIA

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Final Environmental Assessment

TIMBER MANAGEMENT PROGRAM FOR SYU-15

CALIFORNIA

Prepared by:

BUREAU OF LAND MANAGEMENT

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STATE OFFICE
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2800 Cottage Way
Sacramento, California 95825

IN REPLY REFER TO
1791 (SYU-15)

Dear Reader:

Enclosed is a copy of the final environmental assessment (FEA) for the SYU-15 Timber Management Program. The final assessment was prepared using the comments received through the public review process on the environmental assessment (DEA).

The environmental assessment is not a decision document. The decision on the action to be taken will be based on the analysis contained in the FEA, public concerns and comments, and other multiple-use resource objectives or programs.

We thank those who provided comment on the DEA or have given other assistance on the DEA during the preparation of this environmental assessment.

Sincerely,

James B. Ruch
State Director

ERRATA SHEET

TIMBER MANAGEMENT ENVIRONMENTAL ASSESSMENT
SUSTAINED YIELD UNIT 15

Appendix C contains some errors which have not been corrected in this printing. The reader is reminded that more precise maps of the timber land classification are available for review in the respective District Offices. Those maps are at a scale of 1 inch equals 1000 feet. Corrections for errors discovered in Appendix C are described below:

1. Redding, Map 6 of 29, section 18, T. 44N., R. 9W., should show a narrow strip of withdrawn forest land along the length of Patterson Creek.
2. Susanville, Map 19 of 27, R. 10E., and R. 11E., should be changed to R. 12E., and R. 13E.
3. Folsom, map 11 of 20, the NE¼NE¼ Section 13, T. 6N., R. 13E., should be changed to Restricted Forest Land.
4. Folsom, map 11 of 20 the SW¼SE¼ Section 7, T. 6N., R. 14E., should be changed to Restricted Forest Land on the south side of the river.

COVER SHEET

DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

Final Environmental Assessment
Timber Management Program for SYU-15

Abstract: The Bureau of Land Management proposes a 10-year timber management Plan for approximately 82,279 acres of public land located in northern and central California, and Nevada. These lands constitute the timber production base for Sustained Yield Unit 15. The preferred alternative would have an allowable cut of 119 million board feet. Intensive management practices, such as pre-commercial thinning and planting, would be prescribed during the harvest period. The allowable cut would provide less than 0.1 percent of employment in the lumber and wood products industry region-wide. Four alternatives are analyzed: management under multiple-use constraints with intensive forestry practices; management under multiple-use constraints without intensive forestry practices; no action; and no timber management program. Analysis of this program will be used to finalize land use plans within SYU-15, as well as the timber management plan.

Major environmental issues and impacts, as identified through the scoping process, are related to endangered and sensitive wildlife species, fisheries, and critical deer winter range habitat; visual resources; cultural resources; and socioeconomics.

For further information contact:

Alan Thomson
Area Manager
Bureau of Land Management
63 Natoma Street
Folsom, California 95630
Tel: (916) 985-4474

Comments on the final environmental assessment should be received by February 16, 1981. All comments should be sent to the address noted above.

TABLE OF CONTENTS

Page No.

COVER SHEET iii

TABLE OF CONTENTS v

SUMMARY ix

Chapter 1--PURPOSE OF AND NEED FOR ACTION

PURPOSE OF AND NEED FOR ACTION 1-1

SCOPE OF ENVIRONMENTAL ASSESSMENT 1-2

Chapter 2--ALTERNATIVES, INCLUDING PREFERRED ALTERNATIVE

INTRODUCTION 2-1

DESCRIPTION OF TIMBER MANAGEMENT ALTERNATIVES 2-3

Alternative 1 (Preferred Alternative)--Intensive Timber Management with Multiple-Use Constraints 2-3

Alternative 2--Limited Investment with Multiple-Use Constraints 2-7

Alternative 3--Maintain Present Management Program (No Action) 2-7

Alternative 4--No Timber Management Program 2-8

TIMBER MANAGEMENT OPERATIONS 2-8

Harvest 2-8

Transportation System 2-15

Slash Disposal 2-15

Forest Development 2-16

Timber Stand Improvement 2-17

DISTRICT IMPLEMENTATION OF TIMBER MANAGEMENT PLAN 2-20

MITIGATION MEASURES 2-20

SUMMARY COMPARISON OF IMPACTS 2-31

IDENTIFICATION OF PREFERRED ALTERNATIVE 2-39

Chapter 3--AFFECTED ENVIRONMENT

CLIMATE 3-1

TOPOGRAPHY AND GEOLOGY 3-2

SOILS 3-2

Tables of Contents (Cont.)

Page No

WATER RESOURCES 3-3

VEGETATION 3-8

ANIMALS 3-10

Terrestrial Animals 3-11

Aquatic Animals 3-17

RECREATION RESOURCES 3-17

WILDERNESS 3-18

VISUAL RESOURCES 3-19

CULTURAL RESOURCES 3-20

LAND USE 3-20

Timber Resources 3-20

Livestock Grazing 3-23

SOCIAL AND ECONOMIC CONDITIONS 3-23

Chapter 4--ENVIRONMENTAL CONSEQUENCES

ASSUMPTIONS AND ANLYSIS GUIDELINES 4-1

IMPACT ANALYSES 4-2

Climate 4-2

Soils 4-2

Water Resources 4-7

Vegetation 4-9

Animals 4-11

- Terrestrial Animals 4-11
- Aquatic Animals 4-16

Visual Resources 4-18

Wilderness 4-20

Recreation Resources 4-20

Cultural Resources 4-21

Land Use 4-22

- Timber Resources 4-22

Social and Economic Conditions 4-23

Energy Consumption 4-27

Unavoidable Adverse Impacts 4-32

Table of Contents (Cont.)

Page No.

SHORT-TERM VERSUS LONG-TERM PRODUCTIVITY 4-33
IRREVERSIBLE AND IRRETRIEVABLE COMMITMENT OF RESOURCES 4-34

Chapter 5 - CONSULTATION AND COORDINATION

INTRODUCTION 5-1
LETTERS OF COMMENT AND RESPONSES 5-2
LIST OF PREPARERS 5-24

REFERENCES CITED Ref-1
GLOSSARY GLOSSARY 1

APPENDICIES

- A--Comments Received During Scoping Process A-1
- B--Authorizing Legislation B-1
- C--Public Commercial Forest Lands in SYU-15 C-1
- D--Allowable Cut Determination Process D-1
- E--Wildlife Species Lists E-1
- F--Major Plant Species in SYU-15 F-1
- G--Threatened, Endangered, and Rare Plants of SYU-15 Region G-1
- H--Economic Analysis H-1

TABLES

Table No.	Title	Page No.
2-1	Summary of Development of Available Timber Production Base	2-2
2-2	Summary of Comparison of Components of Alternatives, including Preferred Alternative	2-4
2-3	Potential Impacts and Applied Mitigation Measures	2-21
2-4	Summary Impact Comparison of Alternatives, including Preferred Alternative	2-32
3-1	Soil Poperties, Land Use, and Managerial Problems for Soils of SYU-15	3-4
3-2	Partial List of Wildlife Species in SYU-15	3-12
3-3	Distribution of Deer Herds Within SYU-15	3-15
3-4	Threatened, Endangered and Sensitive Wildlife Species	3-16
3-5	Summary of Cultural Resources Sites Inventoried in SYU-15	3-22
3-6	Economic Data by County for SYU-15	3-25

Table of Contents (Cont.)

		Page No.
3-7	Summary of Volume Cut and Value Received Fiscal Years 1975-79	3-26
3-8	Costs of Timber Management Projects	3-28
3-9	Total Timber Management Costs by Fiscal Year	3-29
4-1	Relation of Site Factors to Erosion Hazard	4-4
4-2	Comparison of Economic Effects of Timber Management Alternatives	4-25
4-3	Comparison of Energy Consumption, by Alternative	4-28
4-4	Comparison of Short-Term Uses Versus Long-Term Timber Yield	4-35
4-5	Short-and Long-Term Comparison of Economic Effect of Timber Management Alternatives	4-37

MAPS

Map No.	Title	Page No.
1-1	Sustained Yield Unit 15	1-3
3-1	Key to Native American Tribal Territories	3-21
Appendix C	Public Commercial Forest Lands in SYU-15	C-1

FIGURES

Figure No.	Title	Page No.
2-1	Individual Tree Selection	2-10
2-2	Group Selection	2-11
2-3	Shelterwood	2-12

SUMMARY

The Bureau of Land Management, California, has prepared this Environmental Assessment (EA) on its Timber Management Program for Sustained Yield Unit 15 in response to a court suit by the Natural Resources Defense Council. Unit 15 encompasses 141,511 acres of public commercial forest land scattered throughout 24 counties in California and five BLM districts in California and Nevada.

Alternatives

Four alternative management programs have been analyzed in this assessment. The alternatives were developed from a series of inventories of the timber and non-timber resource values, a sampling of public interest and a comparison of alternative levels of intensity of timber management.

Alternative 1--Intensive Timber Management Under Multiple-Use Constraints (Preferred Alternative). Under this alternative, the commercial forest base was identified in place and mapped. The forest base (141,511 acres) was reduced to protect soil, water and other resource values identified in place, using multiple use constraints. Intensive timber management practices were projected on the reduced forest base (82,279 acres). A computerized forest model projected partial timber harvest on approximately 13,410 acres during the first decade. This management program will sustain an allowable cut of 119 MMBF per decade.

Alternative 2--Limited Investment with Multiple-Use Constraints. This alternative utilizes the same forest base as Alternative 1 (82,279 acres) except that the forest model is projected without the additional growth realized from intensive management practices such as precommercial timber harvest on approximately 9,876 acres during the first decade. An allowable cut of 106 MMBF per decade is sustainable under this scheme.

Alternative 3--Maintain the Current Program (No Action). This alternative would maintain the same level of management activity as planned for the fiscal years 1975-79. This level of management was based on expansion of inventory plot data. This preliminary estimate of the forest base and other resource concerns was viewed as an interim management tool. Intensive management practices were projected on the forest base of 91,319 acres. The computer model indicates that 17,758 acres would be partially harvested removing 1/3 of the older timber on those acres in the first decade. An allowable cut of 139 million board feet per decade was calculated for this interim management proposal.

Alternative 4--No Timber Management. No planned timber harvest would be carried out under this alternative. Some protection practices, such as fire suppression and forest pest control, would be continued to protect and, in some cases, enhance non-timber related values and uses.

Specific management practices (harvest, transportation system, slash disposal, and forest development and protection) are also described and their impacts on the environment analyzed.

Areas of Public Concern

Interest groups, local and state governments, other federal agencies and numerous individuals were contacted to determine what aspects of the SYU-15 Timber Management Program were of concern to the public. The following areas of concern were identified during the scoping process, and in written comments:

1. Concern over the effects of timber management activities on fish and wildlife habitat.

   - reduction of critical deer winter range as a result of harvesting hardwood stands thereby limiting available food supplies.
   - adverse impacts of road construction on water quality and the fishery resource.
   - possible impacts on endangered species.
   - raptor nesting and roosting sites for Bald and Golden Eagles.
   - Habitat requirements for Spotted Owl.

2. Concern over the effect of timber management activities on the quality of the environment and visual resources.

   - private landowners want timbered areas adjacent to summer tract developments excluded from logging.
   - use of herbicide spraying.
   - protection and preservation of remnant old-growth Douglas-fir stands for recreation.
   - Native American concerns over the possible destruction of cultural sites.

3. Intensity of timber management practices and activities.

- declining productive forest land base with increased demand for wood products.
- rising cost of lumber products.

4. Social and economic costs and benefit derived or foregone with implementation of the timber management program.

- program costs of implementation.
- employment opportunities.

Conclusions

Analysis has indicated that no significant impacts would result from implementation of any of the alternatives, particularly after application of the specific mitigation measures except for impacts on old-growth dependent wildlife species. The other impacts are insignificant because the BLM commercial forest land in SYU-15 constitutes a small part of the total land and is interspersed with non-commercial forest land and non-forest land usually on scattered tracts surrounded by private ownership. Further-more, 42 percent of the commercial forest land has been excluded from the available timber production base to protect the environment against identified potential adverse impacts.

The proposed management practices and committed mitigation measures conform to the policies and goals of the appropriate Management Framework Plans.

Distribution of Final Environmental Assessment

Copies of this document have been sent to the agencies and organizations marked with an asterisk and to other interested parties. It will be available to any other agencies, organizations or individuals who may request it. Others listed received the draft Environmental Assessment.

Federal Agencies

*U. S. Fish and Wildlife Service
*Soil Conservation Service
*Water and Power Resources Service
*Heritage Conservation and Recreation Service
U. S. Forest Service
    *Regional Office, Region 5
    Klamath National Forest
    Shasta Trinity National Forest
    Modoc National Forest
    Lassen National Forest
    Plumas National Forest
    Sierra National Forest
    Tahoe National Forest
    El Dorado National Forest
    Stanislaus National Forest
    Toiyabe National Forest
    Sequoia National Forest
*National Park Service, Regional Office

State Agencies

*California State Clearinghouse
*Department of Fish and Game
*Department of Forestry
*Department of Transportation (CALTRANS)
*State Historic Preservation Officer
*Native American Heritage Commission
*State Board of Equalization
*State Board of Forestry
*Water Resource Control Board
*Department of Water Resources
*Air Resources Board
*The Resources Agency
Society of California Archaeologists
    Clearing House at California State University, *Fresno, *Stanislaus, *Sacramento, *Chico, *Bakersfield.

County Agencies

Boards of Supervisors
    Alpine County
    Amador County
    Calaveras County
    El Dorado County
    Mariposa County
    Mono County
    Nevada County
    Placer County
    Tuolumne County
    Yuba County
    Fresno County
    Modoc County
    Lassen County
    Shasta County
    Tehama County
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    Tulare County
    Kern County
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Northern California Planning Council
Shasta County Assessor

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Tehama
Yuba
Amador
Calaveras
El Dorado
Mariposa
Placer
Tuolumne
Alpine
Inyo
Mono
Fresno
Kern
Madera
San Benito
Tulare

Schools and Universities

University of California, Davis
University of California, Berkeley
Humboldt State University, Arcata
California State University, Chico
Sierra College of Forestry
Shasta Union High School Districts

Private Organizations

*Society of American Foresters
*Sierra Club
Izaak Walton League
National Audubon Society
Calfornia Native Plant Society
Wilderness Coalition
*Natural Resources Defense Council
*Wildlife Society
California Association of 4-WD Clubs
Roseburg Lumber Company
Bendix Forest Product Corporation
Pomfret Estates
Southern Pacific Land Company
Western Timber Association
Wetsel-Oviatt Lumber Company
De Anza Land and Leisure Corp.
Bohemia Lumber Company
Louisiana Pacific Corporation
International Paper Company
Pacific Gas & Electric Company
W. M. Beaty and Associates
Sierra Pacific Industries
Main Industries
Publishers Forest Products
Collins Pine Company
Coin Lumber Company
Emerson Lumber Company
Snider Lumber Products Company
S.W.F. Plywood., Inc.
Simpson Lumber Company
Trinco Forest Products
American Forestry Association

Chapter 1

PURPOSE OF AND NEED FOR ACTION AND SCOPE OF ENVIRONMENTAL ASSESSMENT

INTRODUCTION

The National Environmental Policy Act of 1969 directs all agencies to prepare a detailed environmental impact statement of all actions significantly affecting the quality of the human environment.

The total timber management program of the Bureau of Land Management was judged to have such a significant environmental impact and an environmental impact statement (EIS) was issued in 1976. Prior to the issuance of the EIS, the Natural Resources Defense Council (NRDC) and others brought suit against the BLM over the Bureau's timber management program. An agreement was reached with the NRDC which specified that (1) EIS's are to be written on the timber management plans for all sustained yield units (SYU) in the Bureau's western Oregon, Ukiah, and Coeur d'Alene-Spokane Districts; and (2) environmental assessments are to be prepared on timber management programs on all other public-land sustained yield units.

PURPOSE OF AND NEED FOR ACTION

This environmental assessment (EA) analyzes the environmental impacts of four alternative timber management programs for SYU-15 during the decade 1975-84 (MAP 1-1). The assessment will serve as the foundation and framework for future environmental analyses of specific actions required for the timber management program at the district level.

The Federal Land Policy and Management Act of 1976 (FLPMA) is the Bureau's principal authority and mandate to manage public lands. This Act establishes guidelines for public land-use planning on the basis of multiple use and sustained yield while providing for the protection of scientific, scenic, historical, ecological, environmental, air and atmospheric, water resource, and archaeological values. As a result of applying this legislation to the timberlands in the SYU through land-use planning, proposed timber harvesting levels have been identified, as have management practices required to sustain and enhance this level of harvest. Mitigating measures to protect the land and other resources have also been identified.

SCOPE OF ENVIRONMENTAL ASSESSMENT

To comply with Bureau policy and the intent of the National Environmental Policy Act of 1969 (NEPA), as amended, and the implementing regulations of the Council on Environmental Quality (CEQ) (Federal Register, vol. 43, no. 230), the alternatives, including the preferred alternative were presented to the public for comment.

A notice announcing the preparation of an environmental assessment (EA) on the timber management plan for SYU-15 was sent out August 17, 1979, to over 100 government agencies, conservation groups, recreation organizations, other interest groups, and individuals. The notice discussed the purpose of the assessment, listed alternative management plans under consideration, and asked for written comments to identify issues of public concern. Each person receiving a notice was requested to indicate his interest in the program by completing a "scoping form" adding to, or commenting on, a list of preliminary issues identified by the BLM during earlier planning efforts. In addition, the NRDC was contacted to solicit their viewpoint on the EA.

For the most part, requests for input from private interest groups and individuals were not successful. Of 131 mailings, only seven respondents offered an opinion or comment. Sixty-four persons replied that they would be interested in receiving more information regarding SYU-15. Comments received are included in Appendix A. A complete list of persons or groups receiving the scoping letter is available in the Folsom District.

Sustained Yield Unit 15 includes part of the Bureau's timber management program discussed in the programmatic Timber Management Final Environmental Impact Statement (Dept. Int., 1976). The programmatic statement provides substantial analyses of cumulative and general impacts of program implementation.

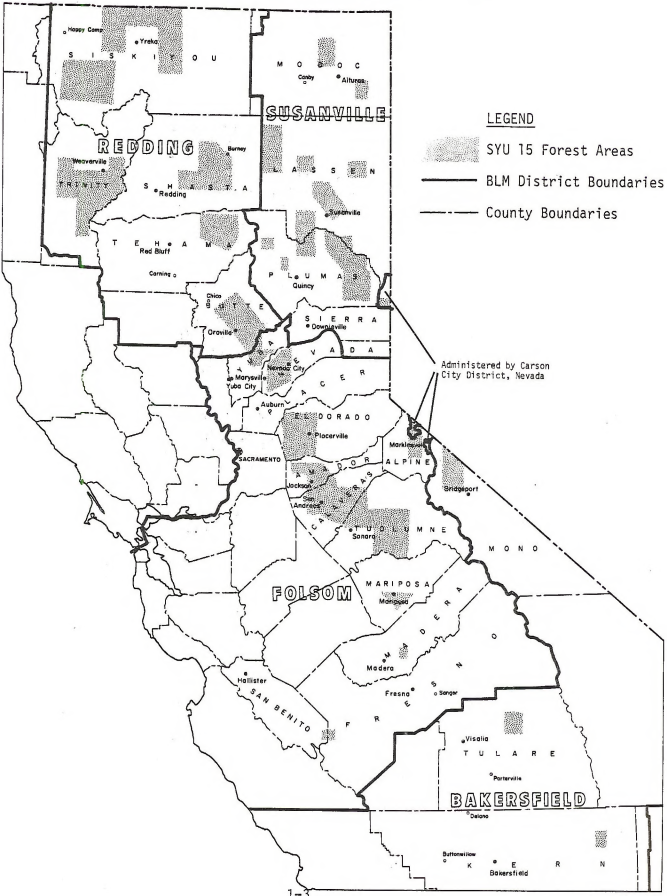
This assessment provides a more intensive evaluation of those actions proposed for SYU-15. These actions include all development, protection, harvest and transportation practices carried out for the purpose of producing raw material to help meet local and national wood product needs. Certain of these practices, such as road construction and forest protection, may be considered necessary regardless of actual forest land use; however, they are included here and described in the context of timber management.

While timber management represents only one component of the Bureau's total multiple-use effort, other forest values, such as recreation, visual resources, minerals, wildlife, watershed, and range are only described in terms of how they are affected by timber management practices.

In accordance with guidance provided by the CEQ regulations of 1978 and based upon the public's input noted above, this assessment is designed to focus primarily on hydrological impacts (including soils); impacts on endangered wildlife species and critical deer winter habitat, visual

UNITED STATES DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
CALIFORNIA DISTRICTS OF
BAKERSFIELD, SUSANVILLE, REDDING & FOLSOM

SUSTAINED YIELD UNIT 15



Map 1-1

resource values, cultural values, and social and economic costs and benefits resulting from implementation of the timber management program.

Environmental topics not identified as of major public concern nor considered significant by the specialists preparing this document are given substantially less emphasis. These elements include climate, air quality, topography and geology, commonly occurring species of vegetation and wildlife, and wilderness.

Chapter 2

ALTERNATIVES, INCLUDING PREFERRED ALTERNATIVE

INTRODUCTION

The following environmental assessment has been prepared pursuant to Section 102(2)(c) of the National Environmental Policy Act of 1969 (NEPA) and the regulations of the President's Council on Environmental Quality (November 29, 1978) for implementing NEPA. The timber management program described in this document follows policy stated in the Federal Land Policy and Management Act of 1976 (FLPMA), specifically Section 103, which defines the principles of "multiple use" and "sustained yield" as they apply to the renewable resources managed by the Bureau of Land Management (BLM). Supplementing FLPMA are various other Federal legislation, national and Bureau directives and policies. These can be found in Appendix B.

This assessment record describes the actions associated with the current timber management program carried out by BLM on forested lands in Sustained Yield Unit 15 (SYU-15) and discusses and evaluates the environmental impacts which could accrue from implementation of any one of the four alternatives.

The goal of timber management within SYU-15 is to maintain the continuous production of timber products under sound economic principles through management that provides for protection and conservation of other basic resources. The intent of timber management planning is to provide information and direction for the purpose of managing and protecting a healthy, productive forest while meeting the Nation's need for wood products while preserving or improving Man's total environment.

The BLM calculated an allowable timber cut for three geographic areas in California. Two of these, the King Range Conservation Area (SYU-8) and SYU-13, are located in the northern coastal region of California in the BLM's Ukiah District. All other BLM commercial forest land in California is included in SYU-15 (MAP 1-1). The BLM administers commercial forest land in 27 of California's 58 counties. Unit 15 encompasses 24 of these 27 counties in five BLM Districts: Susanville, Bakersfield, Redding, and Folsom, California and Carson City, Nevada. Table 2-1 summarizes the development of the available timber production base for SYU-15.

TABLE 2-1

Summary of Development of Available Public Timber Production Base (in acres)

Total public lands in SYU-15		4,585,000
Total public forest lands in SYU-15		669,112
Total public commercial forest lands in SYU-15		141,511
Problem sites excluded from timber production base		50,565
Physically fragile sites	31,308	
Reforestation problem sites	14,782	
Other adverse sites	4,475	
Total public commercial forest lands included in suitable timber production base 1/		90,946
Non-problem sites	36,114	
Physically fragile sites	22,891	
Reforestation problem sites	31,941	
Public commercial forest lands excluded by MFP decision from suitable timber production base		8,667
Total public lands in available timber production base		82,279 2/

1/ from TPCC

2/ includes 6,090 acres identified as capable of producing timber but at less than maximum capacity in light of multiple-use considerations listed in Appendix D, Table D-2.

DESCRIPTION OF TIMBER MANAGEMENT ALTERNATIVES

Table 2-2 summarizes the alternatives by acreage and management class. The four alternative management schemes address a variety of levels of allowable cut based on varying constraints and intensities of management. The specific management practices or operations that could be used to accomplish these allowable cuts are then described in terms of harvest, slash disposal, forest development, and forest protection.

The maps in Appendix C show: (1) areas to which intensive management practices would be applied; (2) areas to which intensive timber management practices would be applied, but under certain restrictions to protect various resource values; (3) areas withdrawn from planned timber harvest to protect resource values; and (4) BLM administered non-commercial forest land. Appendix D explains the allowable cut process including land use allocation proposed for the EA alternatives. Acreage figures are based on a dot count tabulation of productive forest land and area affected by management decisions together with photo and field plot data. This information was then processed by the SIMIX three-stage computerized model which assumes initial entry followed by intermediate and final cuts (modeling procedures are available for review in the Folsom Resource Area Office).

Alternative 1 (Preferred Alternative) -- Intensive Timber Management with Multiple-Use Constraints

The primary objective of the timber management program proposed in this alternative is to produce the maximum amount of raw material from forest lands classified as capable for timber production (TPCC--see Glossary) subject to the principles of multiple use and sustained yield and to the maintenance of environmental quality. This would be accomplished by implementing intensive forest management practices, which include site preparation, planting, and pre-commercial thinning.

The resulting allowable cut for SYU-15 under this alternative is calculated to be 119 million board feet per decade (MMBF/decade) (Scribner Log Rule--see Glossary). Of this, 100 million board feet (84 percent) would be attributed to natural growth, while 19 million board feet (16 percent) would be due to intensive management practices. To produce this volume, during the first decade approximately 7,074 acres of mature timber (73 MMBF) would be selectively cut and 6,336 acres (46 MMBF) would be commercially thinned. Clearcuts are not proposed. However, some areas may be essentially clear cut as a result of fire, insect, and disease salvage.

TABLE 2-2

SUMMARY OF COMPARISON OF COMPONENTS OF ALTERNATIVES, INCLUDING PROPOSED ACTION

COMPONENT	(Preferred Alternative) ALTERNATIVE 1	(Limited Investment) ALTERNATIVE 2	(Maintain Present Management) ALTERNATIVE 3	(No Timber Management) ALTERNATIVE 4
Land committed to forest management program (acres)	82,279	82,279	105,706	NONE
Physically fragile sites (soil, slope etc.) removed from harvest (acres)	31,308	31,308	11,005	N/A
Forest land removed from base due to reforestation problems (acres)	14,782	14,782	-0-	N/A
Other resource values protected from harvest under MFP constraints				
Fragile watershed (acres)	1,026 1/	1,026 1/	6,041	N/A
Streamside buffers (acres)	962 1/	962 1/	5,203	N/A
Natural areas (acres)	222 1/	222 1/	-0-	N/A
Recreational areas (campgrounds, proposed recreation areas) (acres)	96 1/	96 1/	1,748	N/A
Visual resources (acres)	3,642 1/	3,642 1/	10,279	N/A
Wildlife (habitat, rare and endangered species, etc.) (acres)	2,356 1/	2,356 1/	1,519	N/A

1/ These figures do not include lands already removed from timber production base by the TPCC. A tabulation of the acres withdrawn to protect multiple-use values is included in Appendix D.

TABLE 2-2 (cont.)

SUMMARY OF COMPARISON OF COMPONENTS OF ALTERNATIVES, INCLUDING PROPOSED ACTION

COMPONENT	(Preferred Alternative) ALTERNATIVE 1	(Limited Investment) ALTERNATIVE 2	(Maintain Present Management) ALTERNATIVE 3	(No Timber Management) ALTERNATIVE 4
Acreage to be harvested	13,410	9,880	17,760	UNKNOWN 2/
Volume of planned harvest (MMBM)	119	106	139	NONE
Harvest method (acres)				
Selection (80%)	10,440	7,900	14,200	Nominal
Shelterwood (10%)	1,300	990	1,780	-0-
Seed Tree (5%)	650	500	90	-0-
Other (5%)	650	500	90	-0-
Road Construction (acres)	405	405	640	-0-
Slash Disposal (acres)				
Mechanical	1,340	988	1,780	-0-
Lopping and scattering	12,410	7,900	15,830	-0-
Burning	1,340	988	1,780	-0-
Site Preparation (acres/year				
Herbicide spraying	1,380	1,470	1,600	-0-
Clearing and scarification	7,120	7,590	8,220	-0-
Burning	2,130	2,270	2,450	-0-
Regeneration (Planting) (acres)	11,130	12,509	14,400	Nominal
Timber stand improvement--pre-commerical thinning (acres)	850	-0-	1,630	-0-

2/ Salvage sales as a result of wildfires and forest pest control have fluctuated widely in the past. Over the long term this volume would average approximately 200-300 MBM annually.

TABLE 2-2 (Cont)

COMPONENT	ALTERNATIVE 1	ALTERNATIVE 2	ALTERNATIVE 3	ALTERNATIVE 4
Fertilization (acres)	200	-0-	200	-0-
Cost of Implementation ($) 3/	6,146,000	6,057,000	7,077,000	1,744,000 4/
Access costs 5/	2,200,000	2,200,000	2,200,000	Unknown
Forest protection--salvage trees killed by insects, fire and disease	Yes	Yes	Yes	Limited
Harvest of old growth timber acres/decade	6,704	6,704	12,244	-0-

3/ Logging costs for road construction, falling and bucking, lopping and burning, which are reflected in the selling price for timber are not included. Other costs not shown include payments to landowners for access acquisition, appraisal and title fees.

4/ Expenditures to date (1975-79) total $1,696,000. Annual costs for the remainder of the decade would be $9,700.

5/ Based on 20 to 25 easements per year at an average cost of $10,000 per easement, it is estimated that 528 easements would be needed to provide access to all lands in the timber production base. Acquisition should be completed during the 3rd decade.

Alternative 2--Limited Investment with Multiple-Use Constraints

This alternative would incorporate timber production with the same multiple-use constraints applied in Alternative 1, but without precommercial and commercial thinning. The number of acres in the productive forest-land base (from the TPCC inventory) would be modified to take into account other resource values and uses, as in Alternative 1, but with the assumption that the lands left available for timber production would generate yields largely under natural conditions.

Implementation of these practices would result in an allowable harvest of 106 million board feet per decade. During the first decade, this volume would be cut from approximately 9,876 acres of productive forest land.

Alternative 3--Maintain Present Management Program (No Action)

This alternative would maintain the same level of management activity that occurred during Fiscal Years 1975-1979. This is based on the 1974 extensive inventory plot data and the 1975 preliminary allowable cut calculation which was made before the 1978 intensive in-place inventory of timber production capability and multiple use constraints. Consideration was given to fragile sites and areas where reforestation would be a problem as well as multiple-use constraints. This preliminary estimate was based on expansion of data collected at the field plot locations, which does not give as accurate information as the in-place inventory of the same information used to develop the allowable cut for Alternatives 1 and 2. Consequently, the timber land base in Alternative 3 is larger and the allowable cut is greater than in Alternatives 1 or 2. The allowable cut was computed for 140,632 acres of commercial forest land, an estimated 34,926 acres of which were projected to be excluded for non-timber related values (watershed, streamside buffers, wildlife habitat, etc).

An additional 44,627 acres was subject to an average 33 percent reduction in productivity to allow for protection of non-timber related values such as watershed, streamside buffers, wildlife habitat, etc. Thus, an estimated 105,706 acres managed intensively under multiple-use constraints would be expected to have the same level of productivity as 91,319 acres intensively managed without multiple-use constraints. The intensity of timber management practices under this alternative is generally the same as under Alternative 1. Management actions in the past have relied on site-specific environmental assessments to identify problem areas pending completion of the intensive inventory.

The allowable harvest under this alternative would be 139 million board feet per decade. During the first decade, 7,383 acres of mature timber (84 MMBF) would be selectively cut and 10,375 acres (55 MMBF) would be commercially thinned.

Alternative 4--No Timber Management Program

Under this program, no planned timber harvest would be carried out. However, some of the protection practices associated with timber management, such as fire suppression and forest pest control, would continue to be carried out to protect and in some cases enhance non-timber related values and uses. The harvest of timber would be by administrative decision and generally be limited to dead, down, and human hazard trees. Road construction for timber harvest would be limited to that needed to salvage timber killed by catastrophies, as mentioned above. An average of 200 to 300 thousand board feet per year could be expected under these restraints.

Timber Management Operations

The timber management operations described below would apply to a varying degree to each alternative. These operations fall generally into four categories: harvest, slash disposal, forest development and forest protection.

Alternative 1, the preferred management program, would include operations in all four categories, as would Alternative 3 but to a lesser extent. Management activities under Alternative 2 would include many of these operations but would not include regular planned intensive management practices such as pre-commercial and commercial thinning, large-scale site preparation and planting; hardwood and brush control; application of chemical fertilizers; and forest genetic improvements. Management practices under Alternative 4 would generally be limited to salvage or hazard-reduction logging operations.

Harvest

The harvest cutting operation is the final phase of the timber growing cycle. The steps associated with harvest include: (1) cutting trees according to the silvicultural system prescribed for each designated harvest area; (2) moving logs or trees from stump to loading points by use of yarding systems; and (3) subsequently moving the logs via transportation systems to the manufacturing center.

Silvicultural Systems

Silvicultural systems are methods of forest management designed to harvest, regenerate, and maintain the desired tree species in a suitable stand structure.

Selection of the appropriate cutting practice is basically determined by management objectives, that is, a certain system is applied to a given timber stand to favor regeneration of the desired species and/or to promote growth and avoid adverse environmental impacts. Factors weighed in selecting the silvicultural systems include forest habitat types, species composition, stand age, stocking, condition (as it relates to tree vigor and risk of mortality), and environmental impacts. Other land uses identified through the Bureau Planning System, economic concerns, and public attitudes also play a major role in selecting cutting practices.

Once the silvicultural system is chosen, the trees designated for cutting and those reserved from cutting are identified on the timber harvest area.

The silvicultural systems available include selection, shelterwood, and seed-tree. These terms describe the method of harvest cutting. Since the forest stand structure is usually diverse, it is often necessary to employ several silvicultural systems on any one timber sale area to meet or maintain management objectives.

In selection cutting (Figure 2-1), individual trees or groups of trees are removed at intervals of between 10 and 25 years. Natural regeneration is established almost continuously. The primary objective is maintenance of an uneven-age stand, with trees of different ages or sizes intermingled singly or in groups. This is achieved by:

(1) Removing overmature, defective, and high-risk trees to improve stand condition and net growth;

(2) Leaving healthy mature trees for seed trees;

(3) Removing small trees of undesirable form;

(4) Providing improved opportunities for natural regeneration.

Selection cutting is the practice most commonly employed on SYU-15 forest lands. This system is aesthetically pleasing but difficult to apply sucessfully unless the stand structure is favorable. Economically, this system is more expensive to carry out than the others because more stand cuttings are required for lower harvested volumes per acre. The two types of selection cutting are: single-tree or individual tree selection and group selection. Either method may involve commercial and precommercial thinning and sanitation-salvage cutting.

Individual selection involves the removal of single trees, rather than groups of trees.

Figure 2-1

INDIVIDUAL TREE SELECTION

Before Cutting

After Cutting

Group selection can be used to maintain a higher proportion of the less shade-tolerant species in a stand than individdual tree selection. For this purpose, larger harvest areas are more effective than smaller ones. In some stands, areas smaller than an acre are generally suitable. In others, the areas may be as large as one acre. The largest group harvest areas resemble small clear-cut areas. The group selection system is distinguished from clear cutting in that a balance of age or size classes is created in a mosaic of small contiguous groups throughout the forest (Figure 2-2).

Figure 2-2

GROUP SELECTION

Before Cutting

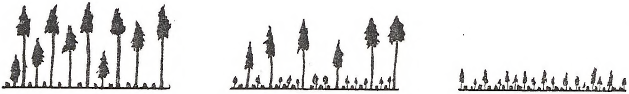
After Cutting

Sanitation-salvage cutting is a form of selection cutting but involves only the removal of individual trees injured or killed by fire, wind, insects, diseases, etc. Harvesting may include both green and dead trees, which are mature and immature. Tree condition rather than age is the criterion for removal.

The shelterwood system involves the removal of a mature stand in a series of cuts. Regeneration of the new stand occurs under the cover of a partial forest canopy. A final harvest cut removes the shelterwood and permits the new stand to develop in the open as an even-aged stand.

This system provides a continuing cover of either large or small trees. It is especially adapted to species or sites where shelter is needed for the new reproduction or where the shelterwood gives the desired species an advantage over undesired competing vegetation (Figure 2-3). Douglas-fir and ponderosa pine are two species which often meet these criteria in SYU-15.

Figure 2-3
SHELTERWOOD



Initial Cut Intermediate Cut Final Cut

Under the seed-tree system most of the commercial timber is harvested on a selected area in one cut. A few of the superior trees of the desired species are left well distributed over the area to reseed naturally. When feasible, the seed trees are harvested after regeneration is established. This system is confined mainly to higher elevation forest sites in SYU-15.

Other cutting practices include: special cuttings, under which timber is harvested in response to specific land-management activities, such as rights-of-way--this cutting is not associated with stand management; and cuttings of firewood and other forest products, which remove trees for firewood, posts, poles, rails, etc., and other products that may be cut from material that has little or no commercial value for sawlogs. Such material is normally cut from culls, dead down material, and slash from recent logging operations. Such practices reduce fuel hazard and help prepare the site for reforestation.

Yarding Systems

The movement of felled timber from the stump to the loading point (landing) is accomplished through the use of a yarding system or combination of yarding systems best suited to the area to be harvested. The selection of a yarding system depends on:

- --Road access to the harvest site;
- --Overall management objectives, for example, protection of soils, water courses, and reserve timber;
- --Physical characteristics of the harvest site (yarding distance, slope, etc.);
- --Cost of the system in relation to the volume of timber to be harvested;
- --Weather; and
- --Form of primary product (peeler log, stud sawlogs).

The various yarding systems used or available for use in this sustained-yield unit are tractors, mobile yarder-loaders, skylines, and helicopters.

Tractor Yarding

Tractor yarding consists of moving logs with a track-crawler vehicle or wheel-type rubber-tire skidder. This type of operation is conducted during dry months on sustained slopes generally not exceeding 40 percent. Both types of tractors are used most effectively for downhill skidding to a maximum distance of 1,000-1,200 feet, depending on topography, equipment type, and size of logs. Uphill skidding for short distances is feasible on gentle slopes, particularly for the larger crawler tractors.

Tractors often complement other systems. A combination sometimes used on sidehills is downhill tractor skidding from the upper part of a harvest site and uphill cable yarding from the lower part to a mid-point roadside landing. Other combinations of tractor and cable yarding are used in special situations of slope, topography, and tree volume.

Tractor yarding comprises approximately 70 percent of the yarding done in SYU-15.

Mobile-Yarder Loading

Mobile-yarder loading is used where tractor yarding is not practical. It is most efficient for uphill yarding. This is a versatile system of cable logging on steep terrain where long yarding distances are not involved--500 feet is normally the maximum distance. These machines are well-suited for commercial thinnings, sanitation-salvage cuttings, and selection cuttings in stands of low per-acre volume. Most mobile-yarder loaders can be operated directly from existing roads, thus eliminating the need for clearings and excavation of landings.

This system is used in approximately 10 percent of the yarding in SYU-15.

Skyline Yarding

Skylines are moving-cable systems which yard or swing logs suspended from wire-rope cables. Most of the newer skyline systems are mobile, have lateral yarding capability, and can be used for both uphill and downhill yarding. There are three general types of skyline systems. Standing skylines usually span 3,000 to 5,000 feet, but shorter systems (1,500-2,000 feet) are now in operation in SYU-15. Slacklines are commonly 1,200 to 1,600 feet long and are comparable to smaller standing skyline systems in capability and application. Standing skylines and slacklines are used for approximately 10 percent of the yarding in SYU-15.

Running skylines are capable of extending 2,000 feet. This system is particularly well-suited to yarding intermediate cuttings and partial harvest cuttings when damage to the residual stand must be minimized. This system is well-suited for use in SYU-15 because selective harvest on steep slopes is increasing in the unit. Running skylines, used approximately 10 percent of the time, are the dominant cable yarding system in SYU-15.

Helicopter Yarding

Helicopter yarding is viable on steep, fragile sites with high timber productivity, particularly where road access is restricted or use of conventional logging systems is prohibited. However, it has certain disadvantages related to production cost, slash disposal, and post-harvest land management. Ideal use in SYU-15 may be in the removal of scattered pockets of high-value timber where extensive road building would otherwise be required.

Transportation System

"Transportation" is the process of moving logs from the landing or loading site in the cutting area to the mill. The main means of log transportation is by logging truck, which requires development of road systems. Because of the intermingled land ownership pattern in SYU-15, long-range timber sale planning is necessary to acquire rights-of-way for these roads. Road locations and standards are determined after considering multiple-use needs through the Bureau Planning System.

Any roads necessary will be built to BLM specifications, usually by the timber sale purchaser under the terms of the sale contract. Where logging is the dominant use roads will be single lanes with appropriate turnouts and structures designed to maintain the road in a safe condition and to protect the road from surface and subsurface runoff. When logging is completed, most temporary spur roads will be closed.

Roads will be limited to standards necessary to accomplish management objectives. Usable widths will range from 10 to 14 feet, with total clearing widths ranging from 20 to 50 feet, depending on topography, vegetation, and road use. Based on the computer forest model, during the first 5 decades approximately 405 acres per decade (11.2 miles/year) of land surface will be taken out of timber production for construction of permanent roads, landings, etc., in SYU-15.

Some of the road-construction activities that may be necessary include:

--Clearing and grubbing the right-of-way by bulldozer or blasting;
--Excavation of the roadbed by bulldozer or blasting;
--Installation of bridges, fords, culverts, and other structures;
--Grading of the road surface; and
--Surfacing of the road.

Where necessary, a dust palliative (such as water or oil) will be applied to road surfaces or subgrades to reduce dust caused by logging traffic.

Slash Disposal

Slash is disposed of to reduce fire hazards, expose mineral soil for seedbed preparation; remove obstacles to natural regeneration and tree planting; prevent insect buildup; reduce aesthetic impacts associated with slash accumulations; reduce obstacles to movement of domestic animals, big game, and other wildlife (including fish); recycle nutrients; and control forest disease.

A variety of slash treatment methods is used in harvest areas, including burning, mechanical treatment, lopping and scattering, and concentrating slash in a central location. Use of slash and debris may be provided through free-use permits.

Slash may be burned over several acres (broadcast burning) or in individual scattered piles (spot burning). Burning is done when danger of fire spreading to adjacent timber is minimal and smoke dispersal is assured. All burning is done in accordance with local practice and applicable regulations on open fire and air pollution standards and in coordination with the local Air Pollution Control Board and the California Department of Forestry.

Mechanical treatments of slash include burial, chipping, crushing, piling, or windrowing (piling the slash in rows). After mechanical treatment the slash can be burned. When it is not burned but left to decompose naturally, the actual volumes remain on site. An estimated 10 percent of the total acres (about 200 acres per year) treated for slash in SYU-15 will receive some form of mechanical treatment.

Lopping and scattering of slash reduces its depth and concentration. Decomposition is hastened because most of the slash is close to the ground where microclimatic conditions favor more rapid decay. This method of slash disposal is feasible under the selective and shelterwood harvest systems. It is estimated that lopping and scattering of slash is presently used 80 percent of the time to reduce slash in SYU-15.

Forest Development

Conifer species will be established on productive forest land following timber harvest or natural catastrophes to promote optimum timber growth. The forest development program in SYU-15 includes: (1) site preparation; (2) regeneration; and (3) timber stand improvement. Not all of these practices are carried out on all areas. Many of these practices represent alternatives, the choice of which depends upon the condition of the timber stand, productivity of the site, economics of the treatment, and other uses of the area.

Site Preparation

Preparation would be needed on approximately 50 percent of the area in need of planting each year to establish an adequately stocked stand of commercial conifer species. The control or eradication of woody or herbaceous vegetation and grass that compete for moisture, light, and space in a suitable seedbed (bare mineral soil) constitutes the majority of the site preparation work presently done in SYU-15. The major site preparation techniques are hand clearing, mechanical clearing and scarification, prescribed burning (see below, Timber Stand Improvement), and to a limited extent chemical spraying of approved herbicides, such as Atrazine and 2,4-D to reduce competition from grasses and brush species.

Feasible alternatives to the use of herbicides are investigated. When they are employed, however, herbicides are selected to meet a specific need. It is estimated that approximately 13 percent of the area to be planted each year would be treated with herbicides. These herbicides are used at the manufacturer's recommended strength for the specific target species at necessary intervals. All herbicide application will follow Federal and State standards and guidelines for pesticide application by considering distance from water, wind speed and direction, temperature, and humidity at the time of spraying. No chemical will be used when there is a probability of water-quality degradation or potential threat to fish or wildlife or their food chains or other components of the natural environment.

Forest Regeneration

Several indicators are used to determine if an area is adequately stocked, that is, if it is not producing as much timber as it is capable of producing. These indicators include: soil depth (30+ inches); minimum annual rainfall (25-30 inches); elevation of the site (usually above 2,500 feet); and the presence of site indicator plant species.

Within SYU-15, trees are usually planted by hand. Seedlings are planted whenever the ground and weather conditions are favorable, generally as soon as possible after timber harvest and/or site preparation.

Most seedlings in SYU-15 are grown by the Placerville Nursery of the U.S. Forest Service using seeds from local seed zones. The most common species planted are Douglas-fir and ponderosa pine. Some sugar pine and white fir are also planted.

Jeffrey -Coulter and Monterey-knobcone hybrids have been planted on selected sites and along road fills in SYU-15. Further studies are being conducted to determine if these hybrids are adaptable for conversion of sites from chaparral to coniferous forest on shallow, dry soils, where reforestation is a problem.

During the first decade an estimated 11,131 acres that are presently understocked or that will be in need of restocking because of planned timber harvest operations would be reforested. These areas should support adequately stocked 10 to 15 year old stands by the end of the second decade. To accomplish this, about 2,000 acres per year would need to be planted during the remaining decade (1980-84). Approximately 10 percent of non-problem sites, 10 percent of physically fragile sites, and 50 percent of problem reforestation sites would be planted if natural regeneration is not adequate. This would amount to 24 percent of the area to be logged each year.

Timber Stand Improvement

Annual timber growth rates can be increased and better quality wood fiber produced if surplus trees are removed from established timber stands. Precommercial and commercial thinning provides optimum growing conditions for reserve trees because much of their competition for light, moisture and nutrients is removed. The spacing or intensity of thinning is determined by the number and diameter of trees per acre (basal area) desired in the reserve stand.

Hand-held power saws, axes, or other similar tools are generally used in precommercial thinning to remove individual trees. Mechanical equipment such as the "bush hog" or "Track-mac" may also be used, especially where brush competition is abundant. Herbicides individially injected into unwanted trees may be used as a very efficient method of pre-commercial thinning.

Commercial thinning in SYU-15 would occur mainly as part of the overall harvest system selected for a given area. If there is no local market for posts, poles and piling, firewood, or wood chips, the thinned material will be lopped and scattered or piled and later burned.

Based on the model plan, 845 acres would be precommercially thinned within the 20 year age class. Since 1975 however, 882 acres have been thinned recognizing on-the-ground needs. It is assumed that little or no thinning would occur during the remainder of the decade.

Another means of improving a timber stand is by application of a nitrogen fertilizer. Recent research (Powers, 1976) has indicated that selected tree species respond well to application of chemical nutrients, especially nitrogen. The standard application rate for nitrogen fertilizers is 150 to 300 pounds per acre, with growth response over 4 to 6 years.

Fertilization within SYU-15 would be carried out on a limited, site-specific basis. Overall tree response would be closely monitored before any large scale programs are initiated.

Forest Protection

Forest protection involves the process of eliminating or minimizing losses to the timber resource from fire, insects and disease, and weather.

Fire

Forest managers in California for the last 50 years have not generally considered fire as a management tool. Emphasis has been on total exclusion. The result has been an unnatural accumulation of fuels and interference with forest ecosystems. Natural succession, vegetation age distribution, wildlife, disease, and insects have all been affected by the exclusion of fire.

Recently, however an increasing number of forest managers have come to accept that fire is an ecological force to be included in the overall management scheme. Prescribed burning shows excellent promise for site preparation, silvicultural practices, nutrient recycling, vegetation manipulation, fuel hazard reduction, and control of diseases and insects. For example, brush and brush seed supply can be effectively reduced through use of prescribed burning over a 5-10 year period on certain sites.

Wildfire prevention activities include:

--Slash disposal, to reduce accumulation of forest fuels;
--Improving access to timber areas for fire crews;
--Public education, by informing the public of potentially hazardous areas and patrolling these areas; during extremely critical conditions, forest lands may be closed to all timber operations and to general public use;
--Inspection of logging equipment under the terms of the timber sale contract for compliance with Federal and State fire laws.
--A continuing program of interagency cooperation in fire presuppression, detection, and suppression with various agencies, including the California Department of Forestry, U.S. Forest Service, and the Boise Interagency Fire Center to define areas of fire protection responsibilities and support.

Insects and Disease

Control of forest insect damage can be accomplished by direct or biological means. Direct control includes removing infested trees to prevent movement of insects to healthy trees. Other means include thinning of dense timber stands and reduction of slash in logged areas.

Biological control includes maintaining habitat for parasitic and predaceous insects and for insect-eating birds and other animals by leaving snag and nesting trees during harvest and by providing wildlife ground cover. For example, cavity-nesting birds such as woodpeckers consume great quantities of insects. If suitable nest trees are left in harvested areas to maintain woodpecker habitat and populations, insect numbers might be reduced and lessen damage but epidemics of bark beetle infestations would not be eliminated.

Forest disease control in SYU-15 aims at eliminating or minimizing the occurrence or spread of dwarf mistletoe, western gall rust, and similar tree diseases. Silvicultural measures are currently used in SYU-15 to control these diseases, including (1) conversion of an area from one species to another; (2) development of mixed-species stands, particularly when diseases are host-specific; (3) maintenance of healthy, vigorous stands by influencing species composition, density, and age; and (4) propagation of disease-resistant trees. Measures (2) and (3) are most often practiced in SYU-15.

The success of physical control depends on removal of the source of the infection. Once a disease has infected a tree, the most practical measure is to remove the infected tree from the stand.

Forest Pest Detection Reports may be used to contribute to the Cooperative Forest Pest Detection Survey and to request laboratory identification and/or field evaluation of damage to trees and to assist in determining the most recent control measures available.

Weather

To prevent damage from weather, leave trees are selected for, among other things, their ability to withstand winds and heavy snows. Prevailing wind patterns as well as the funneling effects of topography are studied. In addition, dense stands are thinned to allow the effects of wind and snow to be dissipated over a wide area.

District Implementation of Unit-Wide Timber Management Plan

The allowable cut plan insures sustained yield - the five-year timber harvest plan implements the allowable cut plan. An operational inventory is necessary to identify specific actions and to set priorities to develop the five-year plan. Each district will carry out an operational inventory and prepare a five-year timber harvest plan, which will be updated annually. This five-year plan will be a program of forest management practices designed to maintain forest productivity and to insure a sustained yield. The plan will include continuous monitoring of forest-stand condition and stocking levels and a program for site preparation, planting, thinning, timber stand improvement, and pest control.

The district timber harvest plan will provide guidelines and recommendations concerning multiple-use management outlined in the applicable MFP for each tract of timber to be harvested. Each tract will be analyzed to assure that multiple-use values are protected and that all known environmental impacts and feasible mitigation have been considered. It should be noted, in areas withdrawn from the commercial forest-land base (as determined in the TPCC or by MFP decision), that it may be administratively determined to harvest timber to protect other resource values. Merchantable volumes harvested are incidental and entirely separate from the timber management goals of this document.

MITIGATION MEASURES

The Federal Land Policy and Management Act 1976 (FLPMA) established policy for BLM administration of public lands under its jurisdiction, thus it governs many of the Bureau's activities. Additional authorities under which the BLM operates and which also guide policy are found in Appendix B. These acts and authorities provide the basis for avoiding or mitigating potential impacts on various resources. Mitigating measures for the alternatives have been incorporated in the description of the timber management operations. These measures are outlined in Table 2-3. Additional mitigating measures developed as a result of the analysis are found in Chapter 4.

Table 2-3

POTENTIAL IMPACTS AND APPLIED MITIGATION MEASURES

Resource/Impact	Discrete Action in Alternatives (including Preferred Alternative)	Mitigation Measure
Air Quality		
Addition of smoke and particles to the atmosphere	Slash burning	1. Other means of slash disposal--chipping, mechanical crushing and burying, etc.--will be used when necessary to avoid excessive amounts of smoke and particles in the atmosphere.
		2. The BLM will coordinate closely with local and regional Air Resources Boards and State Department of Forestry in proper timing of burning to assure that atmospheric and wind conditions are suitable to facilitate rapid smoke dispersion and that fire danger is acceptable.
Road Dust	Transporting logs by truck	3. Haul roads adjacent to recreation use areas and homesites will be watered or surfaced to minimize dust.
		4. Timber sale roads will be watered or oiled where large volumes of timber will be transported or where soil properties will contribute to extremely dusty conditions. Where use of water would draft too much water from streams, alternatives of oiling or other dust palliatives will be used to protect aquatic resources.

Table 2-3 (Cont.)

Resource/Impact	Discrete Action in Alternatives (including Preferred Alternative)	Mitigation Measure
Soil and Water		
Soil erosion	Road Construction	5. New road cuts and major skid roads will be seeded with grass or mulched before winter rains where critical soil conditions exist and where accelerated soil erosion is imminent. Roads will be out sloped where other drainage is inadequate.
		6. Unstable road fill areas will be stabilized where needed by seeding or planting with trees or brush species.
		7. Spur roads and skid trails will be water barred to reduce waterflow and resultant surface erosion.
Soil compaction	Tractor Logging	8. Tractor logging will be restricted to dry months, where compaction is a problem. Landings and skid trails, etc., will be scarified or ripped where necessary.
		9. Major skid trails and landings will be maintained in the same location for re-entry into the timber stand, thus limiting the total area potentially compacted.

Table 2-3 (Cont.)

Resource/Impact	Discrete Action in Alternatives (Including Preferred Alternative)	Mitigation Measures
Soil and Water (cont.)		
Water-quality degradation due to sedimentation	Timber harvest operation, road construction	10. See Measures #5-7.
		11. The State Water Resources Board planning in response to Section 208 of the clean Water Act, which sets best management practices for timber harvesting, will be used as a guideline for timber harvest planning as well as site specific practices developed by each district.
		12. Trees will be felled away from stream courses to keep logging debris from reaching waterways.
		13. Ground equipment will be restricted from unstable streambanks to prevent sedimentation..
	Slash disposal	14. Any slash or debris accidently deposited in streams will be promptly cleared by machine or hand.

Table 2-3 (Cont.)

Resource/Impact	Discrete Action in Alternatives (Including Preferred Alternative)	Mitigation Measures
Vegetation		
Disturbance of non-timber vegetative reproduction	Slash buildup	15. Slash will be disposed of or reduced to allow new vegetation to become established.
Disturbance of rare, threatened, or endangered plants	Timber harvest operations, road construction, slash disposal, forest development operations, mechanical clearing, scarification, prescribed burning, timber stand improvement and herbicide treatment	16. Potential treatment areas will be inventoried during the EA process to determine the existence of federally listed endangered or threatened plants. If it is determined that a treatment will affect these plant species, BLM must initiate a Section 7 consultation (Endangered Species Act) with the Fish and Wildlife Service prior to authorizing the action. The Bureau will also insure that no treatment will jeopardize the continued existence of a State-listed endangered or rare plant. This will be coordinated with the Calif. Dept. of Fish and Game. Plants which are candidates for Federal listings as endangered or threatened, which are considered by BLM to be sensitive will be afforded the full protection of the ESA, unless the BLM, State Director determines on a case-by-case basis that the evidence against listing is sufficient to proceed with the action. The BLM will enter into informal consultation with the FWS on actions which will

Table 2-3 (Cont.)

Resource/Impact	Discrete Action in Alternatives (Including Preferred Alternative)	Mitigation Measures
Vegetation (Cont.)		affect Federal candidate species. For plant species which have been officially proposed for listing, BLM must confer with the FWS if it is determined that an action may adversely affect one or more of such species. If significant impacts cannot be avoided the area will be withdrawn from planned harvest if so determined by a specific action environmental assessment (Instruction Memorandum CA-80-256).
Wildlife		
Federally listed threatened or endangered species	Same as above	17. The BLM will comply with Sec. 7 of ESA 1973 by consulting with the U.S. Fish and Wildlife Service on federally listed species on a district-by-district basis, before finalizing any forest product sale affecting a federally listed species. This will ensure that no such listed species will be adversely impacted by the proposed action (Endangered Species Act. 1973, as amended in 1978; BLM Instruction Memoranda CA-78-13, CA-78-197, CA-79-258).

Table 2-3 (Cont.)

Resource/Impact	Discrete Action in Alternatives (Including Preferred Alternative)	Mitigation Measures
Wildlife (Cont.)		
		18. No activity will be allowed which is contrary to the restrictions stated in the California Condor Recovery Plan (U.S. Fish and Wildlife Service, 1974): (a) No potential roost trees will be logged. (b) No activity will be permitted in critical habitat areas between November 1 and March 15. (*Federal Register*, vol. 42, no. 184, September 22, 1977).
Disturbance of deer forage	Same as above	19. Maximum level of oaks harvested in critical deer winter range will be analyzed in site-specific environmental assessments and specified in oakwood sales.

Table 2-3 (Cont.)

Resource/Impact	Discrete Action in Alternatives (Including Preferred Alternative)	Mitigation Measures
Wildlife (Cont.)		
Disturbance of important wildlife habitat) deer winter range, eagle roosting areas, etc.)	Same as above	20. Adequate snags and downed logs will be left to suport self-sustaining populations of birds and mammals as recommended by mitigation in site-specific EAs.
		21. Where harassment and poaching of wildlife are evident, roads may be closed temporarily to reduce occurrences. Temporary roads will be put to bed, thus discouraging further vehicular traffic.
		22. Logging schedules will be modified in critical habitats and during critical periods of wildlife cycles to minimize disturbance of wildlife.
Destruction of cover	Timber harvest operations yarding Systems	23. Small pockets of undisturbed timber will be left where topography, economic considerations, or physical limitations of the yarding equipment prohibit their use. This will provide immediate cover sanctuary for displaced animals.

Table 2-3 (Cont.)

Resource/Impact	Discrete Action in Alternatives (Including Preferred Alternative)	Mitigation Measures
Wildlife (cont.)		
Disturbance of spotted owls	Timber harvest operations, yarding systems	24. See #23 above. Nest trees or groves will be retained along with permanent water course closest to the nest area. A one-half mile no disturbance zone will be maintained adjacent to nest sites from February through August. BLM will defer timber sales up to two years to locate nest site.
Degradation of aquatic and riparian habitat	Timber harvest operations, road construction	25. Streamside buffers will be designated on all perennial and intermittent streams and on some ephemeral streams as determined by site specific environmental assessment process. The minimum width will generally be 100 feet. No equipment will be used in the buffer strips. End-lining or cable yarding can be used to remove timber. See also Measures #4-7 and #12-14.
	Road Construction	26. Stream crossings will be designed to prevent direct contamination of the fisheries habitat by soil, debris, and rock.
		27. BLM will coordinate with the California Department of Fish and Game on installation or construction of all stream structures (culverts, bridges, trash racks) to insure passage by anadromous fish to upstream spawning areas and to prevent excessive sedimentation from installation of the structures.

Table 2-3 (Cont.)

Resource/Impact	Discrete Action in Alternatives (Including Preferred Alternative)	Mitigation Measures
Wildlife (cont.)		
		28. Erosion control on roads, landings, and yarding trails will be carried out as outlined above (Soil and Water, Measures #5-7, #11 #13) to minimize sedimentation of streams.
Recreation		
Degradation of visual quality	Timber harvest operations	29. View zones throughout SYU-15 will be subject to the VRM inventory system. "The contrast rating analysis (Manual 8430) will provide the basis for predicting whether or not the timber management activity or manipulations(s) will meet the predetermined visual management objectives or classes which are the result of the inventory and planning process (Manual 8411)." Timber harvest may be restricted accordingly.
Creation of dust next to campgrounds or high recreational use areas	Road construction, log-hauling	30. See Measures #3 and #4, above.
Noise and degradation of visual quality	Timber harvest operations, road construction	31. Small visual and sound buffer zones from 100 to 500 feet will be maintained around recreational sites where needed.

Table 2-3 (Cont.)

Resource/Impact	Discrete Action in Alternatives (Including Preferred Alternative)	Mitigation Measures
Recreation (cont.)		
		32. Heavy concentrations of slash will be removed from roads which will be left open after completion of timber harvest activities to reduce visual impacts as well as fire hazard.
Cultural Resources		
Disturbance or destruction of cultural or historical resources	All surface-disturbing activities (e.g., timber harvest operations, road construction, etc.)	33. Each ground-disturbing activity will be preceded by a complete field survey for cultural resources, in accordance with BLM Manual 8100, Cultural Resource Management to determine eligibility (36 CFR800) in coordination with the State Historic Preservation Officer. Significance of sites discovered will be determined. Protective measures which will be undertaken where warranted include: complete avoidance of the site by rerouting or closing of project roads; fencing of the site; relocating the site; or even covering the site. Other measures include documentation, surface collection, excavation, or relocation, depending upon the potential scientific or heritage value of the site and to comply with Section 106 of the National Historic Preservation Act (see also Mitigation Measure #35). Followup inspections will be conducted to determine the effectiveness of protection measures developed in site specific EA's and stipulated in the timber sale contract.

Table 2-3 (Cont.)

Resource/Impact	Discrete Action in Alternatives (Including Preferred Alternative)	Mitigation Measures
Cultural Resources (cont.)		
		34. Timber sale contracts will require the purchaser to protect archaeological, historical or paleontological sites and to suspend operations at the site of any discovery, as well as to notify the BLM authorized officer immediately of the finding.
Disturbance or destruction of National Register sites	Timber harvest operations, road construction, slash disposal, forest development, etc.	35. All sites presently listed or eligible to be listed on the National Register of Historic Places will be protected in accordance with the National Historic Preservation Act of 1966 and Executive Order 11593 (36 CFR 800).
Disturbance or destruction of Native American traditional areas	Timber harvest operations, road construction, etc.	36. At an early stage in planning and development of any timber management activities and well in advance of surface-disturbing activities, the Native American Heritage Commission will be consulted for concerns relative to the Native American Religious Freedom Act (P.L.95-341). If as mentioned in this Act, traditional gathering areas of heritage or sacred value significant to Native Americans are identified, the concerns of the Native Americans will be considered in the EA and in subsequent decisions, pursuant to P.L. 95-341 and subsequent rules and guidelines of the Act.
Land Use		
Disturbance of residential areas by noise, debris, etc.	Timber harvest operations, building, slash disposal	37. Consideration will be given to reducing the impacts near residential properties.

SUMMARY COMPARISON OF IMPACTS

A summary of the environmental impacts of the alternatives after mitigation is present in Table 2-4. See Chapter 4 for details of the impact analysis. Where data was not available to quantify an impact, a qualitative description of the impact has been included.

TABLE 2-4

SUMMARY IMPACT COMPARISON OF ALTERNATIVES, INCLUDING PREFERRED ALTERNATIVE

Major Issues	(Preferred Alternative) Alternative 1	Alternative 2	Alternative 3	Alternative 4
1. Effect of timber management activities on fish and wildlife habitat.				
- Fishery habitat	Sedimentation would result in lowering of water quality after logging. Degree of deterioration would depend on amount of watershed affected and type of logging practices. Normally watersheds would stabilize in 1 - 3 years. Buffer strips along perennial stream channels, road and sale design, and erosion control measures should prevent significant impacts on fisheries.	Same as Alternative 1.	Same as Alternative 1.	In general, good water quality would be maintained, benefiting aquatic wildlife. Soils would be stable due to little surface disturbance; erosion would be localized where wildfires and natural slides or slumps occur. Stream sedimentation would be limited to natural entrophication, thus stabilizing aquatic habitat.

TABLE 2-4 (cont.)

Major Issues	(Preferred Alternative) Alternative 1	Alternative 2	Alternative 3	Alternative 4
-Reduction of critical deer winter range as a result of timber harvesting operations.	13,400 acres of wildlife habitat would be modified during the decade as a result of harvest and thinning operations. Deer habitat would improve during early seral stages following logging. 656 acres withdrawn from timber base and restrictions on on 1, 153 acres of forest land will provide deer winter range cover. Additional winter range may be available on lands outside intensive timber management base.	Impacts, in general, would be aimilar to those described for the preferred alternative. One difference would be that the range of tree age and size classes would be retained (without precommercial thinning) until harvest age (90 years) on 1,690 acres. Reservation of young stems should provide additional cover and edge for deer, smaller mammals, and	Almost 18,000 acrea acres of habitat would be modified during 10-year period. Logging activities would create or maintain browse species habitat.	Eliminating timber harvest practices would have an adverse impace on wildlife species requiring low vegetation for food or habitat. Consequently, reduction in summer range would occur for animals such as deer, rabbits, and grouse. Winter range would, over time, decrease as forest stands approached climax. Species of oak would persist and provide food source during winter.
-Endangered species	Threatened and endangered species such as the Bald Eagle, Peregrine Falcon, and California Condor are protected through mandatory requirements under Endangered Species Act.	Same as Alternative 1.	Same as Alternative 1.	Same as Alternative 1.

TABLE 2-4 (cont.)

Major Issues	(Preferred Alternative) Alternative 1	Alternative 2	Alternative 3	Alternative 4
- Raptor nesting and roosting for bald and golden eagles	158 acres have been withdrawn from logging; 685 acres restricted to protect bald eagles habitat. Pre-sale identification of key habitat areas, or nests, would reduce risk of accidental disturbance. Golden eagle nest sites identified in northern portion of SYU-15 have been withdrawn to protect these sites from damaging logging practices.	Same as Alternative 1.	Same as Alternative 1.	Raptor species would benefit through exclusion of programmed harvest cuts.
- Habitat requirements for spotted owl	Remaining old-growth timber stands would be harvested during first decade, reducing or eliminating 6,700 acres of potential spotted owl habitat.	Same as Alternative 1.	Same as Alternative 1.	With exclusion of fires, vegetation would, over long term, approach climax. Old-growth-dependent species would be favored. Populations of small birds (including spotted owl), inhabiting high foliage canopy would increase. 69 species would benefit.

TABLE 2-4 (cont.)

Major Issues	(Preferred Alternative) Alternative 1	Alternative 2	Alternative 3	Alternative 4
2. Quality of the Environment and Visual Resources				
- Private landowners want timber adjacent to summer tract developments excluded from logging.	Harvest operations would cause some conflict with recreational use, e.,^ recreational experiences dependent on natural-appearing environment would be negatively impacted. But areas subject to high recreational use, such as camp sites and major travel sites, have been withdrawn from intensive timber management through MFPs. Forest areas surrounding summer residences would be examined on case-by-case basis to mitigate adverse aesthetic impacts. Use of selection cutting would result in more open timber stands. Logging disturbances and traffic problems could increase in short term. Public access would improve through construction of approximately 11 miles of new roads every year. Use of these roads and pub-	Visual resources on 1690 acres would be slightly less impacted with exclusion of precommercial thinning.	Visual impact would increase with number of acres harvested.	Largely natural forest would be maintained on public lands. Private landowners would benefit as congestion, noise, and litter decrease. However, those who relate to forests in terms of recreational opportunities would favor additional access to recreational areas.

TABLE 2-4 (cont.)

Major Issues	(Preferred Alternative) Alternative 1	Alternative 2	Alternative 3	Alternative 4
- Private Landowners etc. (Cont.)	lic lands may result in increased trespass, fire damage, litter and vandalism problems for adjacent private lands. Magnitude of problem is specific to each sale area.			
- Use of herbicide spraying	Herbicide spraying on 1,380 acres would not significantly impact biological communities in long term. Short term impact would be eliminated where reforestation proves to be a problem. No ill effects anticipated.	Herbicide spraying on 1,470 acres would be similar to Alternative 1.	1,600 acres will be treated to reduce grass and brush competition. Effects would be similar to Alternative 1.	Elimination of herbicide spraying would maintain grass cover, retarding establishment of conifer seedlings. Long-term productivity of forest would not be significantly affected.
- Protection and preservation of remnant old-growth Douglas-fir stands.	Timber management activities on the 82,279 acres of public lands in SYU-15 identified for intensive forest management would seriously reduce opportunities for preserving isolated old-growth Douglas fir. Approximately 6,700 acres of old-growth stands would be eliminated during the 1st decade.	Same as Alternative 1.	Same as Alternative 1. Approximately 12,200 acres of old-growth stands would be eliminated during the 1st decade.	Old growth stands would be protected.

TABLE 2-4 (cont.)

Major Issues	(Preferred Alternative) Alternative 1	Alternative 2	Alternative 3	Alternative 4
3. Intensity of timber management practices and activities with regard to economic costs and benefits derived or foregone with implementation.				
- Declining productive forest land base with increased demand for wood products	82,279 acres of public land allocated to timber production. Of total 141,511 acres of commercial lands, 50,565 acres are withdrawn due to fragile, reforestation problems, and through adverse conditions. Another 8,667 acres have been withdrawn by MFP decisions to protect or enhance multiple-use values.	Same as Alternative 1.	105,706 acres would be managed intensively for timber production. Harvest levels would increase 20 MMBF over the preferred alternative due to increased size of timber base, which was derived from an unacceptable level of statistical accuracy in considering environmental impacts. This was replaced by intensive in-place inventory of environmental concerns.	Commercial timber base would be reduced 82,279 acres with no planned timber harvest. 119 million board feet of timber would not be available to meet demand for wood products.

TABLE 2-4 (cont.)

Major Issues	(Preferred Alternative) Alternative 1	Alternative 2	Alternative 3	Alternative 4
- Declining production forest, etc. (cont.)	11.9 MMBF of timber would be contributed to the economy per year. Long-term productivity would gradually increase to 18.2 MMBF per year in the 20th decade.	10.6 MMBF of timber would be contributed to the economy per year. No increase in long-term productivity would be realized.	13.9 MMBF of timber would be contributed to the economy per year. Long-term productivity would increase at an unknown rate.	200-300 MBF of salvage timber would be contriuted to the economy per year. No increase in long-term productivity would be realized.
- Program costs of Implementation	Annual program costs would amount to approximately $855,000 including investments (pre-commercial thinning, reforestation, site preparation, etc) incurred to increase wood production. Net annual revenues would be $789,000.	Program costs to implement forest management operations would be approximately $837,000 per year. Net annual revenues would be $627,000	Implementation cost would amount to $1,041,000 per year. Net annual revenues would be $897,000.	Salvage logging would occur intermittently over 10-year period depending on stand conditions. Annual volume of 200-300 MBF would result in management costs of aproximately $10,000 per year. Net annual revenue would be $25,000.
- Employment opportunities	58 jobs would be created or maintained at harvest level of 11.9 MMBF per year. 253 jobs would be provided through indirect employment. This amounts to 0.1% of regional employment.	50 jobs would be created or maintained. 226 jobs or 0.1 percent of regional employment would be indirectly provided.	68 jobs would be directly attributable to timber harvest and processing operations. 0.1 percent or 305 jobs would be created or maintained indirectly.	Employment could not be sustained with no planned harvest. Regionally, no adverse impact on employment would occur. Bureau jobs related to timber management would cease to exist, affecting up to 25 positions.

IDENTIFICATION OF PREFERRED ALTERNATIVE

Authority and General Policy

The range of alternatives for the timber management program is limited by national laws and policy direction by the Director, of BLM. The following laws and directives limit the range of the timber harvest program for the first decade.

Federal Land Policy and Management Act of 1976 (FLPMA): This Act provides for the management, protection, and development of the public lands administered by the Bureau under the principles of "sustained yield" and "multiple use" (see glossary).

BLM Manual 5000 (Forest Management): It is BLM policy that:

- Forest lands determined to be available for commercial timber production are intensively managed to increase timber yield when the demand for timber makes such management economically feasible.

- Forest lands available for timber production but from which there is low product demand are maintained in a healthy condition to assure continuing production capability. Maintenance of such lands provides for harvesting of surplus timber resources and placing them in commercial channels providing that in-place uses or values are maintained.

- Forest lands determined to be more valuable for uses other than timber production are maintained in a healthy condition when consistent with the perpetuation of those higher values. Maintenance of such lands allows for harvesting of surplus timber resources and placing them in commercial channels, providing that in-place uses or values are maintained.

- Complete use of all harvested trees is encouraged, including currently marginal and non-commercial species.

- Forest lands and their resources are protected from fire, insects, disease, and trespass.

- Up-to-date inventories of forest resources are maintained.

- Resource inventory, planning, and management activities are coordinated with other public agencies and owners of intermingled private lands.

- Native tree species are promptly re-established on denuded forest lands.

Alternatives Within the Scope of Law and Policy

Only harvest levels within the scope of the above limitations can be considered for actual selection without changes in law or Bureau policy. The Bureau's Management Framework Planning process, using public involvement, establishes allocations for forest land for the various resource values, i.e., wildlife, recreation, range, lands, watershed, minerals and timber. Land-use suitability and compatibility with public views and considerations are used to determine resource use emphasis and management constraints for given land areas. Both conflicting and complementary uses are assessed and evaluated for the best long-term land-use combinations.

Alternatives 1 and 2 are the end result of the land-use planning process. Both alternatives propose timber management on 82,279 acres of commercial timber land. Resource values not compatible with timber production are recognized and lands are either withdrawn or restricted from timber harvest.

Alternative 1 proposes implementation of intensive management practices. This would result in an allowable cut of 119 MMBF per decade. Alternative 2 proposes intensive management without precommercial and commercial thinning, resulting in an allowable cut of 106 MMBF per decade. This alternative does not consider increased growth as a result of such practices.

Alternative 1 provides a 13 MMBF increase in timber output, balancing benefits and costs. The unit is managed for a full variety of products and services. Bureau timber harvest goals are met with sustained timber production and productivity of other forest resources. No significant adverse impacts would occur with implementation of Alternative 1 as compared to Alternative 2. Alternative 1 is therefore selected as the Preferred Alternative.

Alternatives Not Within the Scope of Law and Policy

Alternative 3, Continuation of Present Management, was within the scope of law and policy when it was developed in 1975. It was based on the extensive inventory which adequately sampled forest stand conditions and acreages but inadequately sampled the effects of the management framework plans and environmental concerns. To improve the reliability of this information, an intensive in-place timber production capability classification (TPCC) (see Appendix C) and an in-place inventory of Management Framework Plan (MFP) considerations were planned. The Alternative 3 allowable cut calculation was intended to serve as an interim management tool until it could be compared with a new allowable cut calculation based on the in-place intensive inventories of the TPCC and MFP considerations. The new allowable cut calculation in Alternative 1 is much more reliable and is proposed to replace Alternative 3. Considering the improved inventories used to develop Alternative 1 and considering the land-use planning criteria of Section 202(c) of FLPMA, Alternative 3 is no longer within the scope of law and policy.

Under Alternative 4, no planned timber harvest would be carried out. However, some of the protection practices associated with timber management, such as fire suppression and forest pest control, would continue to be carried out to protect and in some cases enhance non-timber related values and uses. The salvage of timber would generally be limited to dead, down, and human hazard trees.

Not cutting timber would result in an eventual return to an old-growth, eventually decadent forest in which there would be essentially no increase in timber production due to mortality and decay balancing growth over the long run. This would constitute non-use of an available and needed renewable resource. To many people this may be the environmentally preferred alternative.

The objective of forest management is to make the forest useful to man, considering aesthetic values as well as commodity production. Unmanaged forests do not yield products of the kind, amount or value that are possible through application of silviculture.

This alternative is contrary to the Federal Land Policy and Management Act of 1976, the Bureau's principal authority and mandate to manage public lands.

Chapter 3

AFFECTED ENVIRONMENT

This chapter describes the environment of the areas which would be affected through the implementation of any one of the alternatives described in Chapter 2. The principal elements that make up the affected environment are described in as much detail as necessary to understand only the significant impacts of the alternatives, which are described in Chapter 4.

The areas which would sustain the most significant environmental impacts, as determined during the scoping process (Chapter 1), are listed and described under each of the affected environmental elements later in the chapter.

Impacts on the following environmental elements were not found to be of enough significance to be analyzed in detail: climate, air quality, topography and geology, commonly occurring species of vegetation and wildlife, land use, and wilderness.

For detailed descriptions of the affected environments within SYU-15, site-specific timber sale EAs, which are available within each district office, should be consulted.

CLIMATE

Precipitation in forested areas in the SYU-15 region averages less than 50 inches a year and, in some areas, less than 30 inches, considered the minimum for good timber growth. Most of the precipitation falls between October and April. The 100-year precipitation rate for a 24-hour period is more than 12 inches at a number of points in the Sierra Nevada, the Cascades, and the Coast Range. Snowfall is infrequent except at elevations above 2,000 feet in the Sierra Nevada. Above 4,000 feet elevation, snow remains on the ground for an appreciable length of time each winter.

Winds are generally from the west or northwest during most of the year, although circulation may be governed more by local terrain.

Mean annual temperatures throughout SYU-15 range from 32°F to 60°F. Mean minimum January temperatures range from 16°F to 32°F, and mean July maximums range from 84°F to 100°F. Few portions of SYU-15 are at high enough elevations that the shorter growing season limits timber species and the rate of annual growth.

There are two major climatic factors affecting timber production in SYU-15: lack of adequate precipitation and the micro-climatic effects of south and west facing slopes. Lack of adequate precipitation often limits timber growth in an otherwise capable area. The high evapotranspiration rates on south and west facing slopes cause these slopes to dry out earlier in the spring. Soils are often shallow here because of the lack of moisture and concomitant limited amount of vegetation. Thus, many of these slopes are unsuitable for timber production.

TOPOGRAPHY AND GEOLOGY

Five topographic/geologic provinces or regions are included in SYU-15. The Sierra Nevada Range, the largest and highest in California, lies along the eastern border of the State. Lower elevations on the western slopes, where most of the SYU-15 lands are located, contain many areas of metamorphic rocks including serpentine. Terrain ranges from gentle to very steep.

The Cascade Range is located north of the Central Valley along the Oregon border and includes Mounts Lassen and Shasta. It is composed entirely of volcanic rocks. Most areas range from 3,000 to 7,000 feet in elevation. Many areas are very rocky. Unit 15 lands are scattered throughout this province. Terrain ranges from gentle to steep.

The Modoc Plateau, in the northeast corner of the State, is entirely of volcanic origin. The region consists of a series of plateaus and basins at about 4,000 feet elevation. Unit 15 lands are in mountainous uplands scattered throughout the province. Like the Cascades, many of these areas are also very rocky. Terrain ranges from nearly level to moderately steep.

The Klamath Range, along the Oregon border west of the Cascades, is an area of very steep topography with many peaks and ridges in the 6,000 to 8,000 foot range. Metamorphic rocks predominate. There are some serpentine areas.

The Coast Range lies west of the Central Valley. Elevations range from 200 to 4,000 feet and rocks are mostly sedimentary. The few SYU-15 parcels in this province are along the steep eastern edge and, except for one parcel, they lie north of the Delta area.

SOILS

The soils of SYU-15 are extremely diverse and are the result of a variety of soil-forming factors. These factors include climate, vegetation, topography, geology, and time. Due to the various combinations of these soil-forming factors and the resulting diverse soil patterns, the soil suitability for timber production changes rapidly within short distances.

Most of the soils have weathered from metamorphic, volcanic, and granitic rocks and range in depth from 5 to 80 inches. They occur on gentle steep slopes in mountainous terrain. Most are well drained and permeable with loam or sandy loam surface horizons. Subsoil textures may range from clay to coarse sandy loam. Most have a high percentage of stones and gravel throughout their soil profiles. Water-holding capacity is usually moderate but varies, depending on soil depth and texture.

Almost all soils underlying SYU-15 forest lands have been inventoried and 140 soil series have been identified. Maps and accompanying reports for most of the areas have been published by the Soil Conservation Service and by the Soil Vegetation Survey of the California Division of Forestry. Of the 140 soil series identified in SYU-15, 125 have been classified as suitable for growing commercial timber. These 125 soil series are subgrouped into five Orders. Tax nomic classification of the soils is shown in Table 3-1. One of the most common characteristics of the soils in SYU-15 is a shortage of soil moisture during late summer.

Forested sites range from relatively stable to extremely fragile and from areas of rapid recovery to those slow to recover. On the basis of their classifications at the Suborder level, the soils most likely to present problems in management are those with sandy textures throughout (Psamments), those that are easily eroded (although all soils are easily eroded when they occur on steep slopes), and those strongly influenced by volcanic ash (Andepts). The latter tend to be very dusty, creating health hazards and adversely affecting aesthetic quality.

The Timber Production Capability Classification (TPCC) inventory eliminated some soil areas that are marginal for timber production and others because of conflicting uses. Appendix D shows the acreages excluded from timber production because of fragility.

WATER RESOURCES

The SYU-15 lands lie in three major river basins, the Sacramento, San Joaquin, and Klamath. Major tributaries within the Sacramento and San Joaquin River basins include the San Joaquin, Merced, Tuolomne, Stanislaus, American, Bear, Yuba, Butte Creek, Pit and Feather Rivers. Total runoff from the commercial forest land base amounts to approximately 68,000 acre-feet per year. Beneficial uses of these waters include municipal and domestic supply, irrigation, stock watering, industrial use, recreation, wildlife habitat, fisheries and navigation. The BLM uses these waters primarily for recreation and in maintaining fish and wildlife habitat.

The Trinity, Shasta, Scott, and Upper Klamath Rivers are major tributaries to the Klamath River system. Public commercial forest lands in this area are used for grazing, timber production, mining, and wildlife and fish habitat. Recreation, a major use of the Upper Trinity River, brings many people into the area each year. Quality fisheries and wildlife account for a large portion of recreational demand.

Table 3-1

Soil Properties, Land Use, and Management Problems for Soils of SYU-15

Soil & Map Unit Order & Suborder	Soil Fertility	Soil Moisture Regime	Soil Temperature Regime	Slopes	Number of Soil Series	Problems in Management
Alfisols					33	
Boralfs	high	udic	cryic, frigid	gentle & moderate	3	short growing season
	high	udic	cryic	steep		steepness, shallowness, stoniness
Udalfs	high	udic	mesic, thermic	gentle & moderate	2	erosion
Xeralfs	high	xeric	cryic, mesic, thermic	moderate & steep	28	erosion, drought steepness, stoniness
Inceptisols					43	
Ochrepts	low	udic	cryic	gentle & moderate	20	short growing season erosion
	moderate & high	udic	thermic	gentle		erosion
	moderate & low	udic	mesic	gentle & moderate		erosion
	low	udic	mesic & thermic	steep		erosion, steepness, stoniness

Table 3-1 (cont.)

Soil & Map Unit Order & Suborder	Soil Fertility	Soil Moisture Regime	Soil Temperature Regime		Number of Soil Series	Problems in Management
Inceptisols (cont.)						
Umbrepts	low	udic xeric	mesic	gentle moderate & steep	10	Steepness
Andepts	high & moderate	xeric	cryic	gentle & moderate	13	short growing season, rock outcrops
	high & moderate	xeric	cryic	steep		short growing season, steepness
	high & moderate	udic	isothermic, isomesic	moderate & steep		erosion
Mollisols					21	
Xerolls	high	xeric	mesic	gentle & moderate	17	drought, erosion
	high	xeric	mesic	moderate & steep		steepness, drought
Borolls	high	udic	cryic & frigid	gentle & moderate	4	short growing season

Table 3-1 (cont.)

Soil & Map Unit Order & Suborder	Soil Fertility	Soil Moisture Regime	Soil Temperature Regime	Slopes	Number of Soil Series	Problems in Management
Entisols					14	
Orthents	low & moderate	aridic	frigid	steep	5	dryness, steepness
	low & moderate	aridic	thermic	gentle & moderate		dryness, depth to rock
	moderate	xeric	thermic	gentle		drought, erosion
	low & moderate	aridic	mexic	steep		dryness, stoniness steepness, depth to rock
	low	xeric	thermic	steep		steepness, drought, stoniness
	low & moderate	xeric	cryic	gentle & steep		drought, steepness, short growing season
Psamments	low	udic, ustic & xeric	mesic, thermic & hyperthermic	gentle & moderate	9	low available moisture, low inherent fertility, erosion

Table 3-1 (cont.)

Soil & Map Unit Order & Suborder	Soil Fertility	Soil Moisture Regime	Soil Temperature Regime		Number of Soil Series	Problems in Management
Ultisols					14	
Udults	low & moderate	udic	mesic, thermic	moderate & steep	7	erosion, steepness, stoniness
Xerults	low & moderate	xeric	mesic, thermic	moderate & steep	3	erosion, steepness, drought
Humults	low & moderate	udic	mesic, isomesic isothermic, isohyperthermic	gentle to steep	4	erosion, steepness
Areas with little soil						
Rock Outcrop	-	-	-	steep		lack of soil

Water quality over the southern and central portions of SYU-15 is excellent and well within the limits for all municipal uses (State of California, Water Quality Atlas, 1976). Water quality in SYU-15 areas of the Klamath Basin is also generally excellent. However, there have been several instances of unnaturally high sedimentation and turbidity caused by slides and slumps of timber haul roads on BLM-administered lands on tributaries to the Upper Trinity River. These problem areas are described in the BLM's 208 Water Quality Management Report (1979). This report is available for review in the BLM California State Office.

VEGETATION

Sustained Yield Unit 15 is situated in the Coniferous Forest Biome (Odum, 1959), one of the largest and most economically important vegetation regions in California (Barbour and Major, 1977). A great deal of scientific study and detailed description of the biome have been done (e.g., Odum, 1959; Barbour and Major, 1977; Griffin, 1974; Parker and Matyas, 1978; Critchfield, 1971; Munz and Keck, 1968). Major representative plant species are listed in Appendix F.

Many rare, threatened, or endangered plant species or their habitats have been located or are suspected in SYU-15. These species are described in Appendix G.

The biome has been subdivided into six physiographic regions, similar to those described under "Topography and Geology," above.

Inner Coast Range

Douglas-fir is by far the dominant timber species. Shrubs, usually inhibited by the thick tree canopy, are very scattered or are found only where trees are absent or the canopy is open. Herbaceous plants are likewise inhibited or restricted to open areas.

Southern Cascades

The dominant forest type is true fir, Abies. White fir is found at lower elevations, while red fir is found at higher elevations -- between 6,000 -7,000 feet they are found together. Pine trees, ponderosa in the west and ponderosa and Jeffrey in the east, are not as numerous as the firs. The trees form very dense stands, often to the exclusion of understory species. In the fringe area, however, the canopy is more open and understory species are more numerous.

Southeast Cascades

This region is intermediate between the Coniferous Forest and

Sagebrush Biomes. It is placed in the former because of the presence of a considerable number of trees. Elevations range between 4,000 feet to slightly above 5,000 feet. Slopes are usually gentle.

Jeffrey pine is usually the dominant tree. Some areas are savannah, where Jeffrey shares dominance with big sagebrush or bitterbrush. Grass is very common and most of the area is grazed by livestock. Many forbs are found in early summer.

Northern Sierra Nevada

Vegetation of the Sierra Nevada represents a continuum from north to south, although vegetation at the northern end differs substantially from the southern end. The two regions are distinguished in this report for ease of reference.

The Northern Sierra Nevada extends roughly from Lassen Peak on the north to the American River on the south. Public forest lands administered by BLM in this region are primarily below 4,000 feet elevation, although several tracts in the Susanville District are as high as 6,500 feet.

Ponderosa pine and Douglas-fir often share dominance. Incense-cedar is usually a subdominant. Shrubs are usually inhibited by the thick forest canopy. Poison oak is often the most abundant shrub. Bear clover (mountain misery), a major component of the Southern Sierra Nevada region, is often present but seldom abundant. Herbaceous vegetation is also sparse due to competition with the trees.

Forest pathogens are a recurring problem. Dwarf mistletoe is often found in pines. Bark beetles are often a serious cyclical problem especially during drought years, usually every 7-11 years.

Southern Sierra Nevada

Elevations in this region range from 2,000 feet in the northwest to 6,000 feet in the southeast. The Southern Sierra Nevada forest occurs in two distinct phases: Douglas-fir and ponderosa pine.

The Douglas-fir phase is located on steep, damp, cool, north-facing slopes. Although the phase is dominated by Douglas-fir it includes other conifers. A few hardwoods such as maul oak, black oak, and bigleaf maple also occur. Shrubs are usually suppressed by the thick tree canopy, but often there is a great deal of the ubiquitous poison oak. Few herbs are found.

The ponderosa pine phase is found on warm, dry, relatively level ridge tops and east and west facing slopes, usually in an open, parklike situation. Ponderosa pine often shares dominance with bear clover (mountain misery). The low shrub inhibits conifer regeneration. A few giant sequoias (Big Trees) are found on public lands in the extreme southern portion of the region at higher elevations.

Herbs are usually suppressed, not by the forest canopy, but by the bear clover. Blue wildrye and mountain brome are often the only ones that can compete. Other grasses are found in open areas where bear clover is absent.

Central South Coast Range

This unique area, which lies only on serpentine soils, is located in the highest reaches of the Diablo Mountains, from 3,000 to 5,000 feet elevation. Slopes vary from almost level to more than 80 percent; they average 60 percent.

The area is well known for its unique vegetation. Coulter (big cone) pine and Jeffrey pine share dominance. The former makes second-grade lumber due to its limby, weak, brittle, and coarse-grained nature. Digger pine is found at lower elevations. This is the only known place in the world where these three pine species are found together. It is also the only known place where natural hybrids of Coulter and Jefferey pines occur.

Incense-cedar is found here, although the surrounding area is considered too dry to support this species. Palmer oak, usually found on the edges of the Sonoran Desert 400 miles to the south, occurs here also. The only known populations of San Benito manzanita and San Benito mint are found here. These are quite common in the area and are thus not considered rare or endangered. Two very rare and endangered species do occur, however: rayless layia and San Benito evening primrose. Other unique species found are Alvard oak (a shrub) and reed grass. The latter is a huge grass common in the rest of California but highly unusual in the Diablo Mountains.

Grasses are uncommon in this area, although several species can be found. Forbs are likewise uncommon and are generally restricted to moist areas.

Many pines are infected with dwarf mistletoe. The bark beetle, however, has been rarely seen here.

ANIMALS

The scoping process determined that a major public concern involved the effects of timber management activities on fish and wildlife habitat. This issue revolved around:

- potential reduction of critical deer winter range as a direct result of harvesting hardwood/pine (oak-conifer type) stands thereby limiting available food supplies;

- adverse impacts of road construction on water quality and the fishery resource;
- possible impacts on endangered species;
- raptor nesting and roosting sites for bald and golden eagles; and
- habitat requirements for spotted owl.

Therefore, old growth and mature forest habitats, as well as oak-conifer types and their associated species will receive major emphasis.

Unit 15 is inhabited by a large variety of wildlife. There are up to 400 vertebrate species which either reside in or migrate through the area, depending on season of use. There are approximately 46 species of fish, 24 amphibians, 27 reptiles, 211 birds, and 80 mammals.

Their distribution within the unit is closely related to specific habitat types, although not uniformly. The term "habitat" refers to an area with a suitable combination of nonliving (climate, soil, water) and living requirements necessary to support a specific animal species. Some wildlife species are extremely adaptable and find many different habitats favorable. Other animals have evolved highly specialized adaptations to specific habitats and cannot survive in others.

Oftentimes a combination of vegetation types contributes to formation of a specific habitat type. In SYU-15, a mixed conifer type results from various mixtures of white and red fir; ponderosa, Jeffrey, sugar and digger pines; and Douglas-fir and incense-cedar. An oak-conifer type is a result of black oak with coniferous species. Riparian habitat types are associated with areas bordering creeks, springs, or seeps and consist of deciduous species such as willow, alder and aspen. Brush habitat types consist of low growth deciduous species and are generally less moist than riparian sites. "Edge" or ecotone refers to the interface between other habitat types, particularly open areas and more dense types such as mixed conifer.

Terrestrial Animals

Table 3-2 is a partial listing of wildlife and bird species found in SYU-15, with an indication of their abundance and associated habitat. A complete listing is available on request from the Folsom District. Information contained in Wildlife/Habitat Relationships: Western Sierra (USFS, 1978) was used extensively in determining species occurrence.

The mixed conifer and oak-conifer types make up the majority of lands within SYU-15. Twelve species of tree-form oaks are associated with these types and are an important component of the public lands.

TABLE 3-2

PARTIAL LIST OF WILDLIFE SPECIES IN SYU-15

	Relative Abundance			Associated Wildlife Habitat							
	Abundant	Common	Occasional	Mixed Conifer	Oak/Conifer	Riparian	Meadow	Meadow/brush edge	Meadow/forest edge	Brush	Brush/Forest edge
MAMMALS											
California Mule deer		X		X	X		X	X	X	X	X
Black Bear		X		X	X			X	X	X	X
Mountain lion			X	X	X			X	X	X	X
Bobcat		X						X	X	X	X
Coyote		X		X	X			X	X	X	X
Gray Fox			X						X	X	X
Yellow-bellied marmot			X				X	X			
Raccoon		X				X	X				
Ringtail			X					X		X	X
Marten			X	X				X	X		X
Fisher			X	X					X		X
River Otter			X			X					
Striped Skunk		X				X	X	X		X	X
Porcupine		X								X	X
White-tailed jackrabbit			X					X	X	X	X
Douglas squirrel (Chicharee)			X		X				X		X
Deer mouse	X			X	X	X	X	X	X	X	X
Woodrat			X							X	X
Mole		X		X	X						
Shrew		X				X	X		X		
Rat			X		X	X			X	X	X
REPTILES											
Western fence lizard	X			X	X			X	X	X	X
Rubber boa		X		X	X			X	X	X	X
Common kingsnake		X		X	X	X	X	X	X	X	X
Western aquatic garter snake		X				X	X				
AMPHIBIANS											
California newt		X				X					
Ensatina		X				X	X				
Western toad		X		X	X	X	X				
Pacific treefrog		X		X	X	X	X	X	X		
Mountain yellow-legged frog		X				X	X				

TABLE 3-2 (cont)

Relative Abundance

	Abundant	Common	Uncommon
BIRDS			
Red-tailed Hawk	X		
Goshawk			X
Cooper's Hawk		X	
Blue Grouse		X	
Mountain Quail		X	
Band-tailed Pigeon	X		
Screech Owl		X	
Great Horned Owl		X	
Belted Kingfisher		X	
Common Flicker	X		
Nuttallis Woodpecker		X	
Hairy Woodpecker		X	
Black Phoebe		X	
Steller's Jay	X		
Clark's Nutcracker		X	
Mountain Chickadee	X		
Western Bluebird	X		
Brewer's Blackbird	X		
Northern Spotted Owl			X

Several wildlife species depend on these oaks and associated habitat for food and cover. At least 63 wildlife species depend on oak mast, twigs, and leaves for food. This use amounts to 50 percent or more of the annual diet of deer, squirrels, wild turkeys, wild pigs, jays, and acorn woodpeckers. Squirrels, turkeys, and many deer populations are so dependent on acorns in their fall and winter diets that complete mast failure is usually followed by significant decline in reproduction the following year.

Along with providing food for wildlife, oaks and other hardwoods provide habitat diversity. A mixture of hardwood species and conifers creates both horizontal and vertical edge. It is in such areas that resident migratory populations of Columbian black-tailed deer and mule deer are found. Table 3-3 shows deer herds which have been identified as using public lands within SYU-15. These herds, for the most part, are migratory, following rather fixed routes between historical summer and winter ranges. Many of the best winter range areas, which are critical to maintenance of populations, have been usurped by human activities. The BLM, through land-use planning, has withdrawn a total of 656 acres and restricted timber management activities on 1,153 acres of deer winter range.

Threatened and Endangered Species

Federally protected threatened and endangered species include the bald eagle, peregrine falcon and California condor. Eight other species are accorded sensitive or special interest status by BLM and the California Department of Fish and Game (CDFG). These are listed in Table 3-4.

Bald eagles are occasionally seen throughout the unit, although breeding occurs in Shasta, Butte. Lassen, and Modoc counties. These raptors are found primarily associated with young or mature forests of varying canopy closure within ponderosa and mixed conifer types. Nesting areas have been located in the Susanville and Redding Districts. A major roosting area for bald eagles can be found near Mt. Dome in the Redding District. Within these districts 158 acres have been withdrawn from logging and 685 acres restricted to protect habitat for bald eagles.

Sensitive Species

Golden eagles are on the State of California's fully protected list and are accorded sensitive species protection by BLM. Nesting sites have been identified on public lands in the northern part of the unit.

Species Requiring Special Management

The spotted owl has been observed in several locations almost always in association with multi-layered old-growth forest. The spotted

TABLE 3-3

DISTRIBUTION OF DEER HERDS WITHIN SYU-15

District	Deer Species	Use Patterns (Resident)	Use Patterns (Migratory)	Critical Deer Winter Range
Folsom				
Nevada City	Black-tail		X	yes
Downieville	Black-tail		X	no
Grizzly Flat	Black-tail		X	no
Railroad Flat	Black-tail		X	no
Salt Springs	Black-tail		X	no
Camp Beale	Black-tail	X		no
Mariposa	Black-tail	X		no
Placerville	Black-tail	X		no
Stanislaus	Mule		X	no
Tuolumne	Mule		X	no
Yosemite	Mule		X	no
Redding				
Jenny Creek	Black-tail		X	yes
Trinity River	Black-tail		X	yes
Shasta	Black-tail		X	yes
Susanville				
East Warner	Mule		X	no
Modoc	Mule		X	no
Carson City				
Carson River	Mule		X	yes
Bakersfield				
Mineral King	Mule		X	yes

TABLE 3-4

THREATENED, ENDANGERED AND SENSITIVE WILDLIFE SPECIES 1/

Species	Federal List	State List	BLM-Proposed Sensitive List
Wolverine		R	
Bald Eagle	E	E	
Golden Eagle			S
Peregrine Falcon	E	E	
Osprey			S
California Condor	E	E	
Shasta Salamander		R	
Limestone Salamander		R	
Red-legged Frog			S
Modoc Sucker		R	
Rough Sculpin		R	

E = Endangered
T = Threatened
R = Rare
S = Sensitive

1/ Federally listed species are protected by the Endangered Species Act of 1973 (as amended 1978), which states that the habitat of all threatened and endangered species must be protected. The same protection is afforded the State-listed rare species and the BLM-proposed sensitive listed species (BLM California State Office Instruction Memoranda CA-79-46 and CA-79-295). BLM Policy (BLM Manual Section 6840) further assures protection and consideration of threatened and endangered wildlife.

owl is highly vulnerable due to low reproductive rates, dependence on special or limited habitat and requirements for large areas of habitat. This owl is an uncommon carnivore at the top of the food chain and relies heavily on arboreal rodents (flying squirrels, red tree mice, and woodrats). These rodents appear to reach their greatest abundance in old-growth forests where large mistletoe clumps or broken and rotted-out tops provide nesting and winter roosts for owls. Studies conducted in Oregon by Forsman (1976) found that the average height and diameter of 18 nest trees was found to be 101 feet and 54 inches respectively. Spotted owls appear to require a territory of up to 300 acres or more.

Public lands contain some of the last remaining stands of old-growth timber. It is generally accepted that with today's timber management practices, the private lands surrounding BLM lands will never again reach a seral stage compatible to old-growth dependent wildlife, because they will be harvested before timber reaches that point (Toffoli, CDFG, 1979). It cannot be assumed that the private sector will provide old-growth habitat because there is no incentive to do so.

Aquatic Animals

Three major river systems, the Sacramento-San Joaquin, Klamath, and Lahontan, drain the sustained yield unit. Aquatic areas within the unit also include a number of lakes, reservoirs, and small ponds. These systems support from 5-79 species of both game and non-game fish. The most common include rainbow, brown, and brook trout. Anadromous game fish such as silver and king salmon and steelhead occur outside the boundaries of SYU-15 in major downstream tributaries. Silver salmon generally prefer smaller coastal streams and show only rarely in the Sacramento-San Joaquin system. King salmon and steelhead spawning runs occur in the Klamath, Trinity, Smith, Eel, and Sacramento-San Joaquin systems. Reservoirs used by Kokanee salmon are fed by tributary streams originating on forested lands. A complete list of species is available upon request from the Folsom District Office.

RECREATION RESOURCES

Public comment during early scoping for this project raised several issues relating to recreational use of public lands in SYU-15:

(1) Private landowners are concerned that timbered public lands adjacent to summer home developments will be logged.

(2) Some individuals would like remnant old-growth Douglas-fir stands protected and preserved for recreation.

(3) There is concern that herbicide spraying will affect and interfere with recreational use of public timber lands.

In general, public lands managed by BLM in northern California are not heavily forested, thus increasing the recreational value of the lands that are. The forested areas of SYU-15 are natural recreation sites. They offer hunting, fishing, off-road vehicle trails and hiking and camping opportunities, as well as the emotional appeal of visual beauty, solitude, and shelter. These lands are intermingled with privately owned lands and thus are heavily used by adjacent landowners. The forested lands along streams are intensively used for camping, swimming, and suction dredging and panning for gold, especially during the summer months. The most heavily used are the Indian Creek Recreation Area in Alpine County, the Trinity River area west of Redding, and Mokelumne and American Rivers. Most of the recreation sites used by the public are undeveloped. Throughout the SYU-15 area, there are six developed campgrounds.

WILDERNESS

The wilderness process consists of three phases. The first phase (inventory) included a review of all BLM-administered roadless areas of 5,000 contiguous acres or larger for wilderness characteristics. Those areas which were found to lack the necessary values were removed from further wilderness consideration. Areas found to have wilderness values have been identified as Wilderness Study Areas (WSAs) and are scheduled for study and analysis under the Bureau's land-use planning process. On December 28, 1979, 72 roadless areas were formally designated as WSAs in the Bakersfield, Folsom, Redding and Susanville Districts. Of these, only three include lands within the SYU-15 timber production base:

Bakersfield Unit CA-010-023--6,382 acres of BLM-administered lands, approximately 374 acres of which are in the timber base;

Redding Area CA-030-402--2,397 acres of BLM-administered lands, approximately 574 acres of which are in the timber base; and

Susanville Area CA-020-708--4,330 acres of BLM-administered lands, approximately 33 acres of which are in the timber base.

Susanville Area CA-020-211--16,950 acres of BLM-administered lands, approximately 376 acres of which are in the timber base.

During the second (study) phase, these WSAs will be further evaluated for wilderness suitability. During the third (reporting) phase those WSAs found suitable for wilderness designation will be recommended to the Secretary of the Interior, the President, and then to Congress for Wilderness designation.

Designation of these Wilderness Study Areas was based on an assessment as required in Section 2(c) of the Wilderness Act of 1964. The size criterion for the unit in Redding depends partly on classification of contiguous U.S. Forest Service lands under their RARE II program. Any change in the current RARE II recommendations for the Forest Service areas will include assessment of the wilderness potential of the BLM units. The first unit in the Susanville District is adjacent to the Modoc National Forest South Warner Wilderness Area. The second Susanville unit meets the size criterion by itself. The Bakersfield unit meets the size requirement because it is adjacent to the lands proposed for wilderness by the National Park Service.

The wilderness characteristics of these Wilderness Study Areas depend on maintaining their existing physical, ecological, and aesthetic values. The BLM's role, until these areas are formally designated or not designated by Congress as Wilderness Areas, is to continue to manage the lands so that their wilderness suitability is not impaired.

During each phase of the wilderness process public comment has been and will be solicited and considered in reaching decisions or in making recommendations for the next phase.

Bureau decisions to drop areas from further consideration as potential wilderness can be protested, as have some of the areas within SYU-15. In some cases where the BLM considered the protest but upheld its initial decision, protest decisions have been appealed to the Interior Board of Land Appeals (IBLA). Under the Bureau's protest and appeal process, BLM will manage these lands in a manner that will not impair wilderness suitability (Sec. 603(c), FLPMA), until a final decision on designation of these lands is reached, either by BLM or by the IBLA.

These protests and appeals, for the most part, were undertaken after the determination of the timber production base through the TPCC and MFP processes.

Correlation between these protested or appealed areas and the SYU-15 lands included in the timber production base has not been made.

VISUAL RESOURCES

The visual resource management system (BLM Manual 8411) evaluates the degree of modification a landscape can sustain by considering (1) the inherent quality of the scenery being viewed; (2) the degree of user interest in scenic quality and concern for changes in the landscape features; and (3) the visual distance (whether an area can be seen as foreground, middleground or background, or is seldom seen from a travel route or sensitive area). Once the scenic quality, sensitivity level, and distance zone for a given area are determined, the area is classified according to specific management objectives and according to differing degrees of modification in the basic elements of the landscape (form, line, color, texture).

The inventory and analysis of visual resources according to the VRM system outlined above has not been completed for all lands in SYU-15; as a result, uninventoried lands have not been designated as falling within specific VRM classes. These designations will be completed during pre-sale assessments.

Because of high value viewsheds in the Trinity River area 90 acres along Highway 299 have been removed from the timber production base. Unit-wide, logging practices have been restricted on an additional 3,542 acres to protect visual resources. These restrictions apply along major roads, trails and recreation developments.

In SYU-15, some forested areas capable of sustaining intensive forest management practices are located near residential sites and in distant view zones of major highways. Other areas are seldom seen by the public.

CULTURAL RESOURCES

Historical and archaeological resources are found throughout the SYU-15 area. A key to Native American tribal territories within the limits of SYU-15 is shown on map 3-1. A 10 percent (9,600 acres) random stratified cultural resource sample of 105,751 acres of forest land in SYU-15 has revealed 67 cultural resource sites. Table 3-5 summarizes the site descriptions and settings. Statistically the inventory indicates an average density of at least one site for every 144 acres of forest land surveyed thus far within SYU-15. However, the actual density of sites is expected to be higher because thick duff layers on the forest floor, dense brush, and heavily mined areas make it difficult to thoroughly examine many`areas which are usually condusive to occupation. The inventory sampled the forest land in the entire Folsom District, the Markleeville Planning Unit of Carson City District, the Coleville Planning Unit of the Bakersfield District and the Trinity Planning Unit of the Redding District. Records of the inventory and identified sites are retained in the respective district offices.

The following general conclusions concerning sites and locations are based on observations noted during the inventory.

1. Most cultural resource sites were located near water or on flats or ridges and in meadows.

2. Most prehistoric sites were either bedrock mortar sites or lithic scatters.

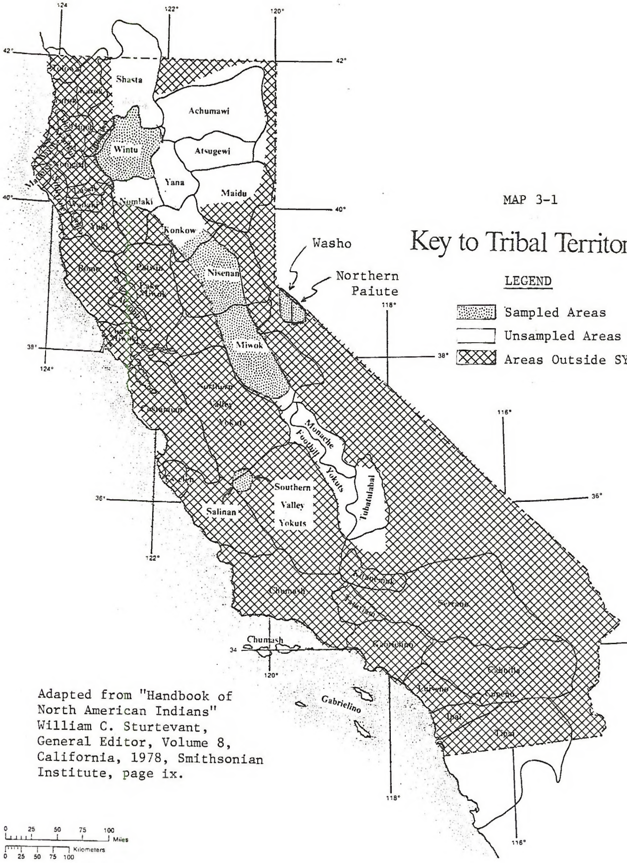
3. Most historic sites were mining-related or trash dumps.

4. Many prehistoric and historic sites may have already been destroyed or damaged by recent activities such as mining, lumbering, fire control methods, and various types of construction and occupation.

LAND USE

Timber Resource

Much of the original timber in the SYU-15 region was harvested before 1900 during the development of California. The regrowth on this cut-over land now meets local demand for forest products, such as saw timber, plywood, poles, fence posts, fuel wood, chips for particle board, and pulp for paper. The northern portion of SYU-15 was less exploited in the development of the West and contains a greater portion of the old-growth saw timber.



MAP 3-1

Key to Tribal Territories

LEGEND

▒	Sampled Areas
☐	Unsampled Areas
▨	Areas Outside SYU-15

Adapted from "Handbook of North American Indians" William C. Sturtevant, General Editor, Volume 8, California, 1978, Smithsonian Institute, page ix.

TABLE 3-5

SUMMARY OF CULTURAL RESOURCES SITES INVENTORIED IN SYU-15

Prehistoric sites - 47 each (from 4000 BC - circa 1850)

Site Description		Environmental Setting
Isolated artifacts	5	Near creeks, rivers, and on ridgetops, flats, meadows, slight, moderate, and steep slopes
Lithic scatters	14	
Bedrock mortar sites	21	
Midden sites	8	

Historic Sites - 19 each

Site Description		Environmental Setting
Mining settlement	2	Near creeks, rivers, and springs, and on flats, ridgetops, meadows, and slight slopes
Mining camp	2	
Mining related	4	
Trash dumps/scatter	5	
Stone structures/walls	4	
Cemetery	2	

Ethnographic Sites - 1 each

Site Description		Environmental Setting
Structure	1	Steep slope

Because of the fragmented land ownership pattern in the region, public lands in SYU-15 encompass a range of forest productivity from nearly brushland to high-elevation forest sites. The productive forest land is often adjacent to National Forests or to holdings of large timber companies.

The proximity to the National Forests offers opportunities for cooperative timber management through joint timber sales, site preparation, tree-planting projects, and easement acquisition.

The encroachment of residential subdivisions on the forest and the increasing numbers of people using the public lands for recreation have increased the need to maintain timber production on a sustained-yield basis while, at the same time, providing for a variety of other uses.

Livestock Grazing

Some of the forested areas in SYU-15 are under grazing authorization. The most significant amount of livestock grazing takes place in the Southern Cascade-Sagebrush Scrub Ecotone Region. Often there is a considerable amount of perennial grass under the trees, which is excellent cattle forage.

There is little livestock forage in the Northern and Southern Sierra Nevada Regions. Thus, grazing is of nominal importance. Most domestic grazing animals are cattle, although there are a few goats and horses. These areas are generally unsuited to sheep.

Agriculture

No prime or unique farmland will be impacted by any of the alternatives.

SOCIAL AND ECONOMIC CONDITIONS

Issues of importance identified by the public during the scoping process included: the intensity of timber management practices, and social and economic costs versus benefits derived or foregone with implementation of the timber management program. These concerns are the result of:

- a declining productive forest land base and an increase in demand for wood products;
- a rising cost of lumber products;
- program costs of implementation;
- employment opportunities; and
- impacts on public health due to herbicide spraying.

Total timber harvest for the region, including all public and private sources, is about 50 percent of the State's total harvest. Since 1975, the sale of timber from BLM-managed land has accounted for about 0.2 percent of the total timber harvest in the region (Table 3-6). The major timber supplier is the U.S. Forest Service. The forest products industry depends heavily on timber from government managed lands and is concerned about the decline in California's lumber production since the mid-1950s. Underlying this trend is the decreasing availability of timber. California's lumber production, which in 1965 totaled almost 5.3 billion board feet, is projected to decline to 4.4 billion board feet in 1980 (Oswald, 1970). Part of this decline is due to the fact that private lands have been cut over and second-growth stands are not yet producing merchantable products, have been converted to other uses, or have been set aside as parks or wilderness. The projected decline is also based on anticipated pressures for natural area recreation, second home developments, and other demands which an expected population of over 31 million people will place on the land.

Concurrent with the decline in raw material supply will be a decline in forest industry employment. This decline could be as much as 6,765 fewer jobs in the Year 2000, as compared to 1965 levels of employment.

Due to the variation in timber sales from BLM-managed lands, no particular mill or community can be said to be dependent on BLM timber supplies in the SYU-15 region. Over the past five years the volume sold has varied from 3.4 million board feet to 13.4 million board feet. In addition, the location of sales has varied widely. Also, although the allowable harvest level has been 139 million board feet per decade, from 1975 to 1979 the sale volume has averaged only 7.9 million board feet per year. This apparent shortfall has resulted from shifts in BLM-California priorities and inadequate staff in the BLM district offices to prepare additional timber sales.

The forest products industry alone employs about 13,000 people in the region. It has been estimated that 5.7 people are employed in the logging and forest products industries for each million board feet of timber harvested (BLM, Redding District, 1978, Social-Economic Profile). If the allowable cut level of 13.9 million board feet per year had been reached, about 79 jobs would have been attributable to BLM timber sales. The actual sale level may be credited with 45 jobs in the logging and forest products industries in the region.

Total employment is also affected by indirect employment, the spending of incomes earned by those in the logging and forest products industries. The total employment related to a change of 1 million board feet is estimated to be no greater than 22 jobs. On this basis, as many as 306 jobs spread throughout all sections of the economy could be attributed to a harvest level of 13.9 million board feet. This is about 0.1 percent of the 233,000 people employed regionwide in 1976.

Table 3-6

ECONOMIC DATA BY COUNTY FOR SYU-15

County	Population (1977)	Percent of Land in Federal Ownership			Total Timber Harvest (1976, MMBF)	Percent Contribution to Total Timber Harvest		Lumber and Wood Products Employment (1977)	Total Employment 1976 1/
		BLM	Other	Total		BLM	USFS		
(Northern Interior Sub-region)									
Lassen	18,850	35.1	27.1	62.2	123.3			525	6,200
Modoc	8,200	10.3	55.5	65.8	98.3			NA	3,900
Shasta	99,300	4.7	41.0	45.7	451.5			2,950	35,950
Siskiyou	37,150	2.4	59.5	61.9	364.4			2,425	12,975
Trinity	10,200	3.3	69.4	72.7	255.0			-	3,775
Subtotal	173,700				1,292.5	< 1%	57%	5,900	62,800
(Sacramento Valley Sub-region)									
Butte	125,900	1.7	20.5	22.2	69.9			1,650	44,325
Nevada	37,350	2.5	30.7	33.2	54.8			675	13,050
Plumas	14,400	0.5	70.8	71.3	220.4			NA	5,175
Sierra	2,980	1.4	61.6	63.0	88.3			NA	950
Tehama	33,850	2.4	25.1	27.5	158.3			1,625	11,025
Yuba	45,850	0.8	29.4	30.2	34.9			1,425	13,192
Subtotal	260,330				626.6	< 1%	36%	5,375	87,717
(Mother Lode Sub-region)									
Amador	16,000	1.8	22.3	24.1	39.5			NA	5,250
Calaveras	16,500	4,8	19.1	23.9	60.4			NA	5,100
El Dorado	65,600	1.3	50.0	51.3	228.0			750	26,625
Mariposa	8,925	5.6	46.3	51.9	20.5			NA	3,125
Placer	96,800	1.3	37.9	39.2	117.6			700	32,763
Tuolumne	27,400	2.3	75.3	77.6	184.5			NA	9,150
Subtotal	231,225				650.5	<1%	60%	1,450	82,013
(Sierra Sub-region)									
Alpine	850	4.4	85.9	90.3	3.5	<1%	90%	NA	
Total	666,105	7.0	48.3	55.3	2,573.1	<1%	53.8%	12,725	232,530
State of California	23,664,030	15.6	29.3	44.9	4,731.3	<1%	Unk	26,969	8,820,000

Source: Planning Area Analysis for SYU-15, BLM, 1979 and Redding District Social Economic Profile, BLM, 1978

1/ California County Fact Book, 1977-78

Table 3- 7

SUMMARY OF VOLUME CUT AND VALUE RECEIVED FISCAL YEARS 1975-79

	Contract and Negotiated Sales[1]/					Other Sales[2]/		TOTAL	
Fiscal Year	Number of Sales	Acres	Volume (MBF)	Value ($)	Average Stumpage Rate Per MBF ($)	Volume (MBF)	Value ($)	Volume (MBF)	Value ($)
1975	12	1,082	6,516.4	416,806	63.96	192.60	4,287	6.709.0	421,093
1976	13	2,147	13,437.3	743,001	55.29	145.7	8,344	13,582.0	751,345
1977	13	407	3,432.2	240,003	69.95	291.8	14,608	3,724.0	254,641
1978	51	2,767	11,397.7	1,254,267	110.05	427.3	15,819	11,825.0	1,270,086
1979	23	1,368	7,860.7	1,057,014	134.47	236.5	12,460	8,097.2	1,069,474
TOTAL	112	7,771	42,644.3	3,711,091	86.74	1,293.9	55,518	43,937.2	3,766,639

1/ Modifications to contract sales included in volume, value and stumpage rate.
2/ Includes negotiated cash sales and other forest products.

In addition to employment and earnings, SYU-15 timber sales supplemented local public revenues through the sharing of BLM receipts with county governments. From 1975 to 1979, BLM timber sales averaged $742,000 per year (Table 3-7). Four percent of timber sale revenues or approximately $30,000 per year, has been returned to the State of California since 1975. The rest of the receipts are retained by the Federal Government with 20 percent going to the general fund and 76 percent to the Reclamation Fund.

Over the period of 1975 to 1979, average advertised timber sale prices increased from $63.96 per thousand board feet to $134.47 per thousand, an increase of 212 percent. Timber prices are expected to continue to increase in relation to other prices. Receipts from timber sales during this period exceeded program implementation costs by an average of $378,000 per year. Approximately 176 acres were thinned and 200 acres planted per year from 1975 to 1979 (Table 3-8). Table 3-9 shows total program expenditures during this period.

Table 3-8
COSTS OF TIMBER MANAGEMENT PROJECTS
(BY FISCAL YEAR)

	FY-75			FY-76			FY-77			FY-78			FY-79			
PROJECT	(Ac)	(Cost)	(Cost/Ac)	(Ac)	(Cost)	(Cost/Ac)	(Ac)	(Cost)	(Cost/Ac)	(Ac)	(Cost)	(Cost/Ac)	(Ac)	(Cost)	(Cost/Ac)	Total Cost
Thinning																
Contract	197	$39,400	$200.00	206	$25,745	$125.59	50	$2,500	$50.00	104	$5,304	$51.00	100	$10,769	$107.70	$83,718
Other 1/	0	0	0	0	0	0	15	Unk	Unk	200	Unk	Unk	10	Unk	Unk	Unk
Site Preparation																
Clearing	30	2,400	80.00	42	4,200	100.00	0	0	0	46	6,660	144.78	0	0	0	13,260
Herbicide -																
Atrazine	30	480	16.00	4	64	16.00	0	0	0	0	0	0	0	0	0	544
2,4-D	25	1,275	51.00	42	2,184	52.00	87	5,481	63.00	86	6,135	71.34	23	2,001	87.00	17,076
Terrscing	25	4,180	167.20	0	0	0	0	0	0	0	0	0	0	0	0	4,180
Burning	0	0	0	55	Unk	Unk	0	0	0	0	0	0	0	0	0	Unk
Crushing	0	0	0	38	6,840	180.00	0	0	0	0	0	0	0	0	0	6,840
Planting																
Contract	340	29,980	88.18	150	8,976	59.84	100	5,847	58.47	0	0	0	100	6,261	62.61	51,064
Other	5	Unk	Unk	0	0	0	0	0	0	214	Unk	Unk	93	Unk	Unk	Unk
TOTAL	652	$77,715	$602.38	537	$48,009	$533.43	252	$13,828	$171.47	650	$18,099	$267.12	326	$19,031	$257.31	$176,682

1/ YACC employees and/or fire crews.

TABLE 3-9

TOTAL TIMBER MANAGEMENT COSTS BY FISCAL YEAR*

FY	Work-months	Cost ($)
1975	201.9	291,848
1976 1/	167.1	252,406
Transition Quarter 1976 2/	27.0	65,626
1977 3/	186.3	301,678
1978	186.3	315,105
1979	266.1	469,500
TOTAL	1034.7	1,696,163

1/ Fiscal Year July 1, 1975 - June 30, 1976
2/ Transition Quarter July 1, 1976 - September 30, 1976
3/ Fiscal Year October 1, 1976 - September 30, 1977.
* Costs include BLM workmonths for easement acquisition, precruise and layout, timber sale appraisal, use authorizations, compliance, construction surveys and design, planning, inventory and analysis, and managerial and administrative support.

Chapter 4

ENVIRONMENTAL CONSEQUENCES

This chapter of the environmental assessment forms the scientific and analytic basis for comparing the proposed and alternative actions. The comparative analysis of the alternatives and related consequences is shown in Chapter 2.

Discussions in this chapter include: (1) direct and indirect effects on elements of the human environment and their significance, (2) the environmental effects of alternatives including the proposed action, (3) natural or depletable resource requirements, (4) energy efficiency of the alternatives, and (5) means to mitigate adverse environmental impacts.

ASSUMPTIONS AND ANALYSIS GUIDELINES

In the analyses of the alternatives it is assumed that:

1. Any one or parts of the four alternatives could be included in the eventual timber management plan; therefore significant impacts of each alternative were analyzed equally in depth.

2. The analyses of the impacts are based on the changes that would occur in the affected (existing) environment through the implementation of any one or parts of the four alternatives.

3. Information used for the impact analyses was obtained primarily from resource inventories compiled in conjunction with land-use planning efforts.

4. Analyses of impacts are limited to the scope of the environmental assessment, as described in Chapter 1.

5. The application of mitigating measure (as listed in Chapter 2) is considered inherent in the analyses of impacts on the affected environment. Only those actions which would have a significant impact on the affected environment over and above mitigation are analyzed.

6. Areas withdrawn or restricted to benefit a single resource may also benefit other resource values. For example, streamside buffers withdrawn to protect water quality may provide habitat for rare, endangered and sensitive species, such as the bald or golden eagle. These areas could also enhance other multiple-use values such as wildlife, visual and cultural resources, etc. These benefits were not incorporated in this assessment since the EAs on site specific timber management operations will cover these benefits in detail.

7. Where insufficient data exist to make a realistic analysis of environmental impacts, a "worst case" situation was used.

IMPACT ANALYSES

Through the process of "scoping" it was possible to focus the analysis on only those impacts which would substantially affect elements of the human environment, are of public concern, are controversial, or that deal with elements which are protected by law.

The environmental components found to be of greatest concern were impacts on hydrological and soil resources (and result on fishery habitat); threatened, endangered and sensitive wildlife species; and social and economic conditions. Of moderate concern are impacts on cultural and visual resource values. Significant impacts on those environmental elements are analyzed on a component basis for each of the alternatives later in this chapter.

Climate

None of the four alternatives is expected to have a significant effect on the regional climates, but all of them would have significant, sometimes drastic, effects on the micro-climate of individual harvest sites.

All silvicultural systems would reduce the forest canopy. This would result in the following: more sunlight would reach the ground surface and raise the soil temperature; the solar radiation reaching the ground would increase, as would the drying effect of winds; effective precipitation would increase because more snow and rain would reach the ground surface, leaving more soil moisture for the remaining (and future) vegetation.

Soils

Potential adverse impacts of road construction on water quality and fishery resources were identified during the scoping process as issues of public concern. Related to this issue is the impact of harvest operations on soil resources and the movement of sediment into water courses as a result of erosive forces. Therefore, these areas of concern will be emphasized.

A major effect of timber management activities is soil disturbance. Various soil characteristics are modified as disturbance takes place resulting in beneficial or adverse effects on the soil. For example, seedling germination and survival potential may increase as forest litter and duff are displaced allowing seed of conifer species to make contact with mineral soil. Rate of decomposition of organic matter may also increase. On the other hand, modifications may result in adverse effects on site quality and soil productivity. Of primary concern are impacts of soil disturbance on accelerated erosion, compaction, and fertility of forest soils.

The most important process of accelerated slope erosion is landsliding. Where landslides occur, site productivity is lost or greatly reduced for an indefinite period. Landslide debris reaching stream channels would increase sediment load affecting water quality, fishery habitat and visual quality of the landscape.

Mapping of fragile sites (including landslide risk areas) was done as part of the Timber Production Capability Classification (TPCC). Over 1,500 acres were withdrawn from timber production to protect against erosion and another 220 acres have use restrictions placed on them (see Appendix D). Narrative reports cataloged by township and range showing areas subject to withdrawal and restriction are available in district offices for review. Specific logging practices and road design features will be developed through site specific assessments for individual timber sales to reduce soil disturbance. Elimination of harvesting activities from unstable areas would not, however, prevent all landsliding, since change in vegetative cover is only one of several factors which influence mass wasting. Potential for slope failure at any site depends upon the interaction of five factors - soil depth, soil shear strength, slope gradient, ground-water rise (increased pore water pressure due to intensive storms), and tree root strength. Table 4-1 shows the relative erosion hazard of logging areas in relation to site factors.

The major source of erosion under the Preferred Alternative and Alternatives 2 and 3, would be from road and landing contruction. Poor location and design of timber access road and landings, as well as incorrectly designed structures associated with water control are the most likely causes of flow concentrations. Roads designed and built with inside drainage ditches sometimes are blocked as winter storms slough material into ditches, creating water diversions across road surfaces. Road maintenance during these times is impossible because of wet conditions. Water flowing down road ruts can then erode out deep channels and eventually cause total running surface failure and high sediment loads in drainage ways. Another source of road failure can occur when culverts become plugged with debris and drainage channels are dammed. During this time, fill material can become saturated and fail in mass.

Blading of road surfaces and construction of berms along roads just prior to the onset of wet seasons can produce large quantities of fine-textured material that is loose and readily detachable during a season's first storms. Road grading in the spring after the wet season would eliminate this increased erosional material and reduce overall maintenance costs.

The construction of 110 miles of new permanent roads on 400 acres of relatively undisturbed lands would increase erosion from 5 to 50 times compared to present conditions. The erosion rate for undisturbed or natural lands in SYU-15 is estimated to be 1 ton or less per acre per year. Most of this erosion would occur one to three years after construction and then decline as cut-and-fill banks revegetate.

TABLE 4-1 [1]

RELATION OF SITE FACTORS TO EROSION HAZARD

Site Factors	High Erosion Hazard	Moderate Erosion Hazard	Low Erosion Hazard
Parent rock	Acid Igneous Granite, diorite, volcanic ash, pumice, some schists	Sedimentary and Metamorphic Sandstone, schist. shale, slate, conglomerates, chert	Basic Igneous (Lava rocks) Basalt, andesite, serpentine
Soil	Coarse textured [2] with little or no clay	Medium textured, with considerable silt	Fine textured, largely clay
Mantle Stability	Unstable mantles (cutbank stability Class V)	Mantles of questionable stability (Cutbank stability Class IV)	Stable mantles (classes I, II and III)
Slope	Steep (over 50%)	Moderate (30-50%)	Gentle (0-20%)
Precipitation	Heavy winter rains or intense summer storms	Mainly snow with some rain	Heavy snow or light rain
Vegetation and other organic matter on and in the soil	None to very little	Moderate amounts	Large amounts

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[1] Industrial waste guide - on logging practices. Federal Water Pollution Control Administration. Feb. 1970.

[2] Soil texture refers to the size and distribution of the mineral particles in the soil, the range extending from sand (coarse texture) to clay (fine texture).

Yarding operations would also increase erosion by disturbing and compacting surface layers of soil. The use of heavy equipment would decrease macro-pore space within the soil and result in reduced rates of infiltration of water and percolation through the soil profile. As a result, surface runoff would increase with the potential for causing accelerated rates of erosion.

Compaction would also affect site quality by reducing root penetration and the movement of air and plant nutrients through the soil. Site productivity could be reduced up to 30 years depending upon soil texture, soil moisture content and the type of logging system used. Compaction would be greatest when soil moisture is high and heavy equipment such as crawler tractors is used.

Based on past logging practices, approximately 70 percent of the area would be tractor logged and the remainder logged by cable systems. It has been shown through research that soil compaction would occur on 25 percent of the acres logged by ground skidding equipment, and 9 percent of the areas logged by highlead and cable systems.

Slash disposal would take place on approximately 1,404 acres under the Preferred Alternative. Disposal actions would include gross yarding, lopping, and burning. Erosion rates for gross yarding would be similar to those following tractor yarding while lopping would result in no additional soil movement.

The duration and temperature of slash fires would be major factors causing physical and chemical changes to take place. If organic and mineral soil layers are not protected from high intensity fires, soil fertility and site quality would be lowered through nutrient volatilization. Studies have shown that when organic matter is burned, about half the nitrogen, most of the organic sulfur and some of the organic phosphorous are lost. This is not expected to be a significant problem in SYU-15, however, as the majority of slash will be spot-piled before burning.

While high intensity fires have a net adverse effect on the soil, some beneficial effects do occur. These include the release of nutrients held in the biomass of organic and mineral surface layers during burning. The production of ash also has a neutralizing effect on acidic forest soils, allowing more efficient nutrient absorbtion by plants.

Additional Mitigating Measures

Road construction effects will be minimized by proper location and design of roads to fit land contours. A sustained-grade road increases the amount of disturbed ground as the road cuts through hillsides and ridges and across stream channels. A sustained-grade road also removes from production more land because of higher road cuts and fills necessary to maintain grade.

Roads will be located on natural benches, ridge tops, and flatter slopes wherever possible to minimize harmful disturbances of the terrain and enhance stability of roads. They will also be located well away from streams (except for channel crossings). Roads will avoid routes through the bottoms of steep, narrow canyons, slide areas, wet areas (marshes or wet meadows), ponds, or along natural drainage channels. Inactive slides will not be undercut by roads. Where alternative locations through stable areas are not available, corrective stabilization measures will be incorporated into the road design.

Stream crossings will be made where channel and bank disturbance would be minimal. Excessive sidehill cuts and fills, especially near stream channels, will be avoided. Retaining walls or riprap will be used where needed to increase stability of fill embankments and cuts and to protect fill embankments from water erosion.

Care will be taken to keep sidecast out of headwalls during construction.

Trees and other vegetation will be cleared only from the minimum essential width required for construction and maintenance of roads.

Drainage will be diverted or otherwise disposed of so that it does not pass over or collect in new cuts, fills, or borrow areas. Bridges and culverts will be adequate at all water courses both for permanent and temporary access. Channel changes will be avoided and fill material stabilized with riprap or abutments.

Adequate fish passage will be provided during installation of culverts on those streams with a fish population.

Main haul roads will be maintained at least annually and more often if warranted. Waterbars, dips and drainage structures on spur roads will be maintianed for at least two years after construction.

Temporary roads will be designed to drain by outsloping wherever possible. On long slopes, dips in the road will be constructed to divert runoff from road surfaces.

Soil disturbance during road construction will be kept to a minimum by restricting construction to periods when soil moisture conditions are favorable. Earth-moving activities will not occur when soils are saturated.

Roads other than main haul roads will be closed to all traffic during the rainy season when necessary to minimize erosion.

Tractor logging will not be permitted on wet soils when such use will result in unacceptable soil compaction.

Skid trails will be ripped when needed to improve soil structure. These trails will be located diagonally on the slopes where necessary to prevent high-velocity runoff. Water bars will be constructed as needed.

During slash disposal operations, debris piles will be located on disturbed areas such as landings and skid trails to minimize site deterioration and help prevent erosion.

Summary

Impacts from soil disturbance can generally be related to the total number of acres proposed for harvest. Alternative 3 would have the greatest impact on soils and related water quality, fish habitat and site values. More acreage would be cut over annually (372 acres) with subsequent slash disposal and site preparation activities than would occur under Alternatives 1 or 2.

Impacts on soil productivity would be approximately the same for Alternatives 1 and 2. The only difference would be that pre-commerical thinning would hasten nutrient recycling on 169 acres each year as small stems are eliminated and added to the organic layer.

With mitigation, impacts on soil resources are not expected to be of major significance. Erosion will occur but the exact magnitude is unknown at this time.

Water Resources

Timber harvest and related activities would affect water quality and quantity in different ways, depending on geology, soils and topography; means and types of timber harvest; the amount of disturbance to mineral soil; and the distribution of harvested areas over the watershed.

Increased stream turbidity and sedimentation are the major consequences of poor timber harvest operations. Timber harvest and related road construction tend to accelerate erosion and sedimentation. Roads usually are the major source of the problem.

Sedimentation rates would be highest immediately after logging and road construction. All of the ground skidding and yarding methods would have some potential for significant adverse impacts on water quality, since all would cause some degree of soil disturbance. The effects would be most pronounced on 35 percent or greater slopes and on saturated soils. The resulting disturbance would expose mineral soil to surface erosion, with consequent sedimentation and turbidity of surface waters caused by materials carried downslope in runoff. Rates would tend to decrease to normal within three to five years as disturbed sites are rehabilitated.

Road construction associated with logging, rather than logging itself, would cause the greatest amount of surface erosion and mass soil movement, with degradation of water quality. Although all road construction activities which involve surface disturbance or movement of earth and rock can cause degradation of water quality, of particular concern are stream crossings during bridge construction and culvert installation. Adverse impacts are greatest when roads are constructed on slopes greater than 50 percent and when excavated materials are wasted by sidecasting. The result is that excavated materials may be carried downslope into water courses immediately by gravity or later by surface erosion or sliding and sloughing.

Mechanical treatment of slash using heavy equipment would also result in some soil disturbance with possible water pollution through erosion and sedimentation. The magnitude of water-quality degradation would vary directly with slope, amount of precipitation, area, and depth of the soil mantle.

Chemicals such as herbicides, fertilizers and road oils when used near water courses could directly affect water quality. This would be caused by drift from spraying, spillage into streams, or washing into streams by surface flow.

Stream-channel obstructions could result from felling whole trees, branches, etc., into water courses causing increased bank erosion.

Cutting of trees and associated logging activities, such as road building, would decrease interception of precipitation and increase soil compaction, thus increasing water yield slightly. The greatest increase would be found on areas where seedtree and shelterwood systems are used (less than 20 percent of the area proposed for harvest). Using U.S. Forest Service averages for increases in water yield by cutting method and species type, it is estimated that less than 3,800 acre-feet would be added each year under each of the alternatives. This would be insignificant when compared to the total water yield from commercial forest lands.

Additional Mitigating Measures

Cable yarding across streams will be permitted only if sufficient deflection is available on the yarding corridor to fully suspend logs. This will prevent airborne logs from hitting the edge of creek banks.

Tractors will not be permitted to operate within any stream buffer nor within 50 feet of any perennial or intermittent stream and some ephemeral streams except to construct or use approved crossings. Merchantable trees may be harvested in buffer zones by directional falling techniques, but nonmerchantable vegetation will be left intact. Hardwood control by hand and replanting may be done to maintain the productivity of timber sites.

Buffer zones (if not already established) will be provided around active slide areas. Tractor skidding and road entry will be prohibited within these zones. Downed trees could be salvaged by end-lining from outside the buffer zone.

Summary

Alternatives 1 and 2 would not have a significant potential for adversely impacting water quality on all of SYU-15, although harvest operations could have significant adverse impacts on water quality in localized areas, particularly small stream reaches. A total of 3,891 acres have been deleted from the commercial timber base to protect watershed values. Another 22,803 acres are classified as restricted use areas. Timber practices in these areas will be subject to site-specific EAs.

Alternative 3 would have an impact on water quality to the same degree as Alternatives 1 and 2. Adequate protection of watershed values is assured by the site-specific environmental assessment required prior to implementation of any timber management practices. The detailed examination of each site provides the same consideration of potential impacts as found in Alternatives 1 and 2.

Alternative 4 would not have an impact on water quantity or quality to any degree.

Vegetation

Certain timber management practices may be employed which would result in varying levels of vegetation removal. The primary impact would be on tree species. Such an impact (removal) may be considered short term since revegetation usually begins soon afterwards with regrowth of residual plant species, the establishment of plantations, and invasions by species adapted to open conditions (pioneer species). These pioneer species may be herbaceous or woody vegetation, including trees, depending upon the local situation. Long-term impacts of timber management practices would be felt until an area approaches its original, pre-harvest vegetative structure. Even when harvest is carried out under ideal circumstances, the process takes many years. On poor sites, the vegetation process may be very slow. Long-term impacts would also be reflected in changes in species composition.

The impacts of the various cutting practices include disruption, through tree harvesting, of the upper vegetal layer and partial damage to the lower vegetal layers in the course of felling operations. Seed-tree cutting would produce cutting edges where standing trees would be exposed to wind. Subsequently, windthrown trees may endanger adjacent vegetation by providing a breeding ground for insects or fuel for wildfire.

Impacts of selection cutting would have the least impacts of any of the final harvest cutting practices, since a relatively small amount of vegetation would be destroyed or removed. Selection cutting does not normally increase danger to forest vegetation from wind, fire, or insects because of the absence of large openings or heavy concentrations of slash over large areas.

All harvesting would save some impact on tree species composition. Generally, species in early successional stages are varied in a given habitat type. True climax plant communities are not common. In shelterwood and selection cutting, tree selection which favors productive trees as a seed source may reduce the genetic variability of forest stands. With changing environmental conditions, this might increase the risk of mortality or cause a loss of stand productivity.

The impacts of commercial thinning and mortality salvage would be relatively insignificant due to the minimal amounts of vegetation removed.

The short-term impact of transportation systems, such as tractor skidding, would include the destruction or damage of undergrowth. Yarding could damage residual trees. resulting in rot, particularly in Douglas fir and True firs. Unless extensive soil compaction or loss of soil by erosion occurs, the long-term impact would be to contribute to a relatively early natural regeneration of tree species.

Road construction practices would have a severe impact on vegetation in SYU-15. In addition to the actual removal of vegetation from the area, road construction would destroy vegetation below the road cut or fill where sidecast material (soils, rocks) might be pushed by tractors, dumped by trucks, or blasted by explosives. Land covered by sidecast is often slow to revegetate. Land covered by the road surface would be permanently non-productive except for abandoned spur roads. Even the latter, however, would probably be incapable of producing vegetation similar to adjacent land due to compacted soils. Dust from log hauling may adversely affect plant growth along roads.

Increased sediment from road construction and log yarding may create water environment conducive to aquatic plant growth. In other cases, if silt is heavy enough, it may kill oxygen-producing aquatic plants.

The impacts of the prescribed burning and mechanical treatment method of slash disposal would be essentially the same as those related to area burning and scarification discussed below.

The short-term impact of scarification, mechanical brush cutting, and area burning would be a partial or complete destruction of vegetation. Spot burning of hand piled debris, chipping of slash, hand clearing, clearing of competing vegetation, mulching, and snag felling would have negligible impacts on vegetation. None of the remaining forest development practices would damage vegetation. Their short-term impacts are related solely to re-establishment, growth, and protection of vegetation. These practices include tree improvement, tree seeding and tree planting.

Development practices would have long-term impacts on the forest resource. Trees remaining after thinning would grow at a fast rate and provide a good source of seed, thereby developing a new forest without extensive delays. The effects of some practices, however, may be the reverse of what is intended if they are misapplied. Examples include scarification that compacts soil or removes soil or shrub layers that were providing conditions suitable for tree regeneration, and area burning that removes desirable shrub cover for tree regeneration, causing soil erosion or rapid invasion of other unwanted vegetation.

In general, adverse long-term impacts from scarification and area burning would be most likely to occur on relatively "warm-dry" sites within the ponderosa pine and Douglas-fir areas, especially where soils are shallow and course, and the humus layer is thin or absent. Long-term adverse impacts may also result from use of heavy equipment on wet soils, resulting in compaction. Finally, tree planting or seeding can represent a tendency toward monoculture and the inherent instability of such ecosystems.

Protective measures would benefit vegetation in the long term by insuring continuation of existing forest conditions. Fire-line construction would destroy vegetation directly and indirectly as well when excessive erosion occurs. Retardants would have no significant adverse impact. Insect and disease control programs would have a beneficial impact on the growth of vegetation.

Threatened and Endangered Plants

Impacts on the known habitats of threatened and endangered species listed in Appendix G are expected to be insignificant or non-existent because those habitat areas have been removed from the timber production base.

Site-specific inventories will be conducted for rare, threatened, and endangered plants prior to any surface-disturbing activities. Any areas supporting such plant species will either be removed from any timber production activities or protected in accordance with the mitigation described in Chapter 2, Table 2-3. Impacts on present unknown populations of rare, threatened, or endangered plants would thus be insignificant or non-existent.

Animals

Terrestial Animals

Timber harvest operations can have a substantial effect on wildlife, because the cutting of tree stands is a major habitat modifying activity--wild animal populations change as a result of changes in their environment (food, water and cover). The effects vary from beneficial to adverse based on the specific species being considered and management systems being implemented.

Wildlife can be broadly classified into those species preferring young forest types (less than 90 years of age) and those preferring an old-growth forest type. Examples of species preferring younger forest types are numerous and include deer, mountain quail, blue grouse, bear, ground squirrels, and most species of Western Sierra song birds. These species prefer the grass, forb, brush and young tree understory for their habitat.

Those wildlife species preferring old-growth stands are relatively few in number and include pine marten, fisher, northern spotted owl, black-backed three-toed woodpecker, pileated woodpecker, goshawk, and a relatively small number of rodents and song birds. Table 3-2 lists species occurrence by habitat type.

The greatest effect of timber cutting on terrestrial animal populations would be the elimination or modification of approximately 13,400 acres of existing habitat over the next 10 years. Different cutting schemes would affect this acreage in different ways. Based on past cutting practices, approximately 20 percent of the mature timber would receive a seedtree or shelterwood cut. The remaining acreage would be harvested by single tree selection. An additional 6300 acres would be commercially thinned.

The preferred alternative would result in the eventual conversion of older-growth forests into younger forests. Seedtree, shelterwood, and selection cutting would remove 73 million board feet from older age class stands (100 years and older) on approximately 6,700 acres during the first decade.

Secondary succession would occur on those acres, providing different habitats than previously existed. Generally any partial cutting system would open the canopy, allowing sunlight to stimulate herbaceous plant and shrub development at the mid- and understory levels. These layers would provide food, cover, and edge for wildlife. Deer would benefit as food supplies for grazers and browsers would increase in early successional stages. The number of small vertebrates like rodents (ground squirrels, mice and rabbits), quail, blue grouse, and small birds would also increase with herbaceous plant growth following harvesting. Predators that prey on these rodents would also benefit. A list of native wildlife species whose populations would increase because of a continuous supply of preferred habitat is included in Appendix E, Table 1. (Native species whose populations would remain at about the existing level is included in Appendix E, Table 2.)

In addition to these indirect impacts resulting from disturbance of habitat, short-term direct impacts would include the loss of animals residing in, on, or near selected trees. Primary excavators (woodpeckers) which require dead and defective trees for nesting, roosting, and feeding would decrease in numbers as the maximum rotation period for timber harvest reached 90 years. Secondary cavity nesters, e.g., purple martin, western bluebirds, and pygmy owl would also decrease as dead and defective trees were removed through harvest and commercial thinning activities proposed under the timber management plan.

The harvest of mature and old-growth timber, or parts thereof, would remove the habitat of those species of animals adapted to that ecological stage. It is assumed that habitats in SYU-15 are currently at full carrying capacity. Therefore, unless displaced individuals can adapt to new conditions, they would probably be eliminated or their numbers severely reduced. Approximately 69 species would be adversely impacted. Of these, two mammals (marten and fisher) and 11 birds could possibly be eliminated from portions of SYU-15. Appendix E, Table 3, shows the degree of adverse effect on native populations dependent on old-growth habitat.

Under the preferred alternative 158 acres have been withdrawn and 697 acres placed under restriction to preserve or enhance raptor habitat for bald and golden eagles. It is believed that timber management restrictions and withdrawal of nesting sites are sufficient to maintain existing eagle populations. The 855 acres for eagle habitat requirements, however, is not sufficient to sustain spotted owls, pine marten, or fisher, other wildlife species on the unit that require old-growth vegetation not associated with bald eagle habitat.

If additional acres are not allocated for the management of old-growth vegetation, there is a high probability that the spotted owl and other species dependent on this habitat would be eliminated from the unit. This would occur as older forest stands are converted to stands of less than 120 years of age under any of the alternatives except no timber management.

In deciduous-conifer stands, the harvest of oaks to convert sites to conifers may have a serious impact on the mast crop. Several deer herds use public lands dominated by oaks. They survive on the mast crop during the winter. Depletion of this food source could further diminish herds already suffering from other habitat disturbances. In addition, some 63 other wildlife species dependent on oak mast would be affected (Wildlife/ Habitat Relationships: Western Sierra, 1977).

A properly managed oak harvest can be of benefit to some wildlife. However, black oak tends to give way through natural succession to conifers. These oak stands would require some harvest to maintain an uneven-age composition to prevent stand decadence, thus insuring the replacement process. This impact applies to Alternatives 1,2 and 3 (intensive management), but not to Alternative 4 (no intensive management).

Roads, skid trails, etc., would have the greatest potential for significant impacts on wildlife of all phases of timber management.

Construction of transportation systems would result in both temporary and permanent loss of habitat through the development of roads, yarding areas, and temporary skid trails. Under the proposal, 11 miles of new road would be constructed each year eliminating 432 acres of vegetation. Ground skidding would result in the destruction of low vegetation, compaction of soils and alteration of drainage patterns. Many species of terrestrial wildlife, such as burrowing rodents, birds, and larger, warier animals would be affected. Roads would provide easy access to previously inaccessible areas with the attendant potential of disturbing wildlife by hunting, poaching, wildfires, etc.

Slash disposal also affects terrestrial wildlife species. Slash, if left completely untreated, could provide a micro-habitat of value to small vertebrates while simultaneously serving as a barrier to movement of larger animals such as deer. Lopping and scattering would rapidly dry slash, making a less suitable habitat for bark beetles. Piling of slash would provide a favorable area for several species of smaller wildlife, including quail, which could use such slash piles as escape and thermal cover. Gross yarding, on the other hand, would result in the loss of essential habitat for a number of invertebrates and vertebrates which use logs for lookouts, feeding, reproduction, protective cover, food sources and bedding sites (Franklin, 1979). Over 30 vertebrates nest among dead and down ground litter throughout SYU-15.

A great variety of birds use logs as feeding sites, including the pileated woodpecker. Although this large woodpecker reproduces high up in large hard snags, its feeding habitat is the surface of logs, stumps, and the base of snags (Franklin, et al., 1979). Downed logs are also important to other old-growth dependent species, including the northern flying squirrel, red tree mouse, and red-backed mouse.

The flying squirrel uses logs for cover and as storage sites for winter food. Although the red tree mouse is highly arboreal and nests in the tree canopy, males make use of ground litter (USFS, 1979). The red-backed tree mouse is the dominant vole in the old-growth Douglas-fir forest. This rodent uses the forest floor as well as surface log debris. While these animals prefer virgin coniferous forest, small numbers can be maintained in cutover areas by leaving downed logs (Tevis, 1956). All three species are used as prey by the spotted owl (Whisler and Horn, 1977; and Barrows and Balderston, 1977).

The more abundant dusky-footed woodrat and the bushy-tailed woodrat use downed logs and debris and are also used as prey by the spotted owl and a variety of other predators, including the bobcat.

Slash burning would enrich the soil through rapid recycling of nutrients and would be followed by a vigorous growth of grass, forbs, and shrubs. Crouch (1974) indicates that slash burning increases the food supply for black-tailed deer and also removes obstacles to deer movement.

Hot burns over large areas, however, could lead to soil erosion and increased stream sedimentation (Dyrness, Youngberg, and Ruth, 1957; and Gibbons and Salo, 1973).

Forest development practices include many surface-disturbing activities such as scarification, hand clearing, prescribed spraying, and planting. In the short-term these could have adverse impacts on several vertebrates directly by crushing the animals and indirectly through habitat destruction. In the long-term, forest development would favor successional wildlife species at the expense of old-growth climax species.

Thinning operations cause both positive and negative effects. Traffic, noise, and activity would adversely affect all wildlife by direct disturbance. The physical removal of trees, however, would open up surface area which may temporarily increase ground cover and food supplies.

The use of pesticides would result in the following residual impacts on wildlife:

(1) The food base for some animals, i.e., birds, rodents, and bears, would decrease; and

(2) Depending on the carrier (e.g., diesel oil) and the means of application (aerial or hand), some pesticide residue would cover individual animals and bird eggs.

The control of wildfire would allow the succession of zoological communities to progress. This protection would also allow the accumulation of a fuel base which serves a a potential threat. The Marblecone Fire in Monterey County, California (1977), illustrated the danger of fuel buildup.

Aquatic Animals

Populations of both salmon and steelhead have been declining steadily over the past years. Among the many reasons identified for this decline is degradation of spawning habitat due to poor and uncontrolled logging practices. Primary effects on fishery habitat associated with timber management most commonly occur as a result of logging, slash burning, and road construction. These effects are related to the introduction of sediment and debris into a stream, the removal of riparian vegetation along streambanks and adjacent slopes, and disturbance of soils.

Sediments in creeks can cover spawning gravels and aquatic food organisms with attendant adverse effects on eggs and young fish. Heavy sediment loads, which are introduced by landslides into stream channels during periods of high streamflow, can harm fish directly by eroding gill surfaces. Suspended sediment in deeper pools of streams and lakes also restrict the penetration of sunlight, thereby reducing photosynthetic activity of water plants and algae. This can cause significant changes in stream or lake ecosystems reducing insect life and oxygen levels.

Barriers to fish passage may occur from management activities. Scouring of stream channels is usually associated with landslides due to road construction and log jams. Larger branches reaching waterways tend to form debris dams, especially in small streams. Smaller debris such as twigs and needles can cause significant short-term (one to three weeks) reductions in oxygen levels which is adverse to fish life.

Temperature is a significant regulator of water quality on small streams. The first year in the life cycle of many anadromous fish species is spent in the small headwaters streams. Pathogens, dissolved oxygen, competition from other species, and direct mortality are all influenced by temperature (Brown, 1973).

In a small, shaded stream, the temperature change induced by logging is directly proportional to the amount of exposure given the stream surface and indirectly proportional to the discharge. Many small streams drop below 1.0 cubic feet per second (cfs) during dry summer months. Logging that completely exposes such streams to sunlight causes large changes in water temperature, because direct sunlight provides the major source of energy for heating exposed streams.

One of the most effective means for preventing water temperature change is with a buffer strip between harvest areas and the stream. The configuration of this strip (width, density, species composition) depends on the stream's orientation to the sun, the stream width, solar angle, and tree height. On very small streams, riparian brush is often sufficient to provide necessary shade. Wider streams require large trees.

Within SYU-15, 3,891 acres, primarily located in the Redding District, have been withdrawn from the commercial timber base to protect and preserve watershed values (see Appendix D). Another 962 acres have been placed in a restricted use category. Type of logging system, season of operation and slash disposal methods will be determined in this use category through site-specific timber sale EAs.

In the final analysis, the amount of shade left along a stream and the logging technique best suited to insure the permanence of this shade will vary with each stream.

Chemicals from spray projects to reduce brush competition can drift into or be carried into streams and kill plant life in the water.

Road construction would likely result in increased sediment runoff into streams, especially when adjacent to stream courses (see Soils, Chapter 4, above). Both road construction and maintenance can result in heavy sediment loads in streams.

Threatened and Endangered Animal Species

Impacts on the known habitats of the animal species listed in Table 3-4 are expected to be insignificant or non-existent because those habitat areas have been removed from the timber production base.

Site-specific inventories will be conducted for additional areas of critical habitat prior to any surface-disturbing activities. Any such habitat areas found will be removed from any timber production activities or protected in accordance with the mitigation described in Chapter 2, Table 2-3, or below ("Additional Mitigating Measures"). Impacts or presently unknown areas of critical habitat would thus be insignificant or non-existent.

Additional Mitigating Measures

The direct impacts of logging on wildlife, specifically disturbance and destruction of nest trees used by raptor species, will be mitigated on a case-by-case basis. Logging will be planned to avoid critical habitats such as raptor nest trees and their immediate surrounding area. The BLM will consult with the U.S. Fish and Wildlife Service to determine the degree of potential impacts on bald eagles and peregrine falcons resulting from implementation of any one of the alternatives and to develop an interagency management plan for each nesting pair and for each area supporting communal roosts.

Within established buffer zones, vegetation protecting streambanks will be retained to guard against erosion and provide shading for aquatic species. Logging equipment will be kept out of streams.

Roads will be located, constructed, and maintained so that entrance of sediment and woody debris will be minimized in the stream. Crossing structures may be permanent or temporary (see Soils, Chapter 4 for additional mitigating measures).

Summary

Timber management activities under Alternatives 1 and 2 would result in beneficial effects on the populations of approximately 32 species of wildlife. An additional 105 species will remain at existing levels. These animals require or heavily depend on early stages of plant succession. Alternative 2, which precludes precommercial thinning would provide an additional 845 acres of cover and habitat to species which use small sapling and pole stands.

Intensive management practices could result in a reduction in oaks and other hardwood species thus reducing habitat diversity, unless consideration is given to hardwoods in site-specific timber sale plans.

Adverse effects on 69 species of wildlife would accrue through the removal of older-growth trees, thus reducing or eliminating a substantial number of wildlife species on public lands. Spotted owl habitat could be severely reduced or eliminated under Alternatives 1, 2, or 3.

Alternative 3 assumes that 91,319 acres of commerical forest lands are available for timber harvest. Since the 1975 inventory an additional 169 acres of forest land have been removed from the timber base to protect or enhance wildlife values. An additional 1044 acres have been placed in a restricted category to further protect existing values.

Alternative 4 would cause the least damage to existing wildlife habitat and perpetuate succession toward climax condition (old-growth). This alternative would in the long term be detrimental to species dependent on oak production as conifers replace the hardwood component. Control of wildfires would hasten this condition.

Impacts on fishery habitat would not be significant on the whole of SYU-15. Locating roads around unstable soil areas should greatly reduce or eliminate the chance for catastrophic natural erosion. Likewise, the creation of buffer strips adjacent to water courses and restrictions against certain types of logging practices would normally preserve stream quality and habitat.

Visual Resource

Virtually all timber management practices would alter the visual landscape. Disturbance of the natural environment would affect scenic values over the short or long term, depending on the areal extent of the project and management sensitivity during project planning.

Degree of impact of timber management operations on visual quality would vary with distance from the viewer; silvicultural practices used; placement of spur roads; and location of the harest areas in relation to viewed position, for example, a viewer on a road in a valley with the harvest area along a ridgeline above the viewer.

The greatest adverse impacts would result from road spurs and yarding areas and from barren sites left after harvest. Each of these would interrupt the viewer's scan of the natural landscape because of removal of vegetation and creation of unnatural lines which could dominate the landscape. Degradation of air quality, and therefore scenic quality, would result from burning slash and from dust created by moving vehicles.

Adverse impacts on visual resources would be most significant in the short term. Under Alternatives 1 and 2, 41 acres would be disturbed annually for road construction and 64 acres under Alternative 3. Timber harvest and slash disposal would annually affect visual resources on 1,341 acres under Alternative 1; 988 acres under Alternative 2; and 1,776 acres under Alternative 3.

In the long term, these impacts on visual resources would be minimized. Within several years, most selectively cut areas would be relatively unnoticeable to the casual viewer because of the regrowth of natural vegetation. Reseeding of road cuts and closing of spur roads would lessen the visual impacts of road construction. Judicious use of the timber resource and application of the VRM contrast rating guidelines and of mitigation measures outlined in Chapter 2 (Table 2-4) would also minimize short-term impacts, as well as aid in preserving and enhancing scenic values over the long term.

Beneficial long-term impacts of the proposed timber management program would include:

- Increased access to panoramic views, as well as an increase in the number of vistas available for viewing along travel routes and in use areas due to road construction.

- Increased diversity of vegetative species by interspersing old-growth areas of relatively closed canopies with more open, park-like timber stands which support undergrowth which require more sunlight.

Impacts of timber management practices on specific areas classified under the VRM system or on specific visual resources will be analyzed in greater detail in individual timber sale environmental assessments. These EAs will be prepared as part of implementation of the timber management program before any timber management activities take place on the ground.

Wilderness

No management activities that would impair wilderness suitability characteristics can occur in WSAs or protested or appealed inventory units until final decisions have been made by either the BLM or the Interior Board of Land Appeals (IBLA). Thus, no impacts of the preferred timber management plan (Alternative 1) or Alternatives 2 or 3 are anticipated on wilderness characteristics in the short-term on WSAs on protested or appealed lands that have been included in the timber production base.

Decisions by the BLM on protested areas are expected to be made by the end of FY-80 (September 30, 1980). Assuming that these decisions are not then appealed to the IBLA, other non-wilderness multiple-use management activities, including those proposed under Alternatives 1, 2, or 3, could then be implemented on areas dropped from further consideration as wilderness. These lands and their resources and values would then be subject to the same types of impacts as described elsewhere in this chapter for other lands included in the timber production base.

Areas for which BLM decisions have been appealed to the IBLA would continue to be withdrawn from any timber management or other activites which could impair their wilderness suitablility. Also withdrawn are areas which BLM initially found unsuitable, but which are being or have been re-evaluated as WSAs because of new information supplied to the Bureau during its protest process. All of these areas will remain withdrawn until final wilderness decisions are made.

At this time, it is not possible to estimate when decisions on appealed areas would be forthcoming from the IBLA or when final wilderness decisions will be made. The allowable cut for the entire SYU-15 for the first decade could thus be affected if these lands contain significant stands of timber which were included in the allowable cut calculations. Since the correlation between these areas and the SYU-15 lands included in the timber production base has not been made, it is not possible at this time to estimate the volume of timber potentially lost during the first decade. The specific areas, and their potential timber production, will be identified in site-specific environmental assessments on specific timber sales.

Recreation Resources

Harvest operations would create noise and dust temporarily and would leave the harvest area unsightly in the short term. The natural appearance of the area would return as the slash is disposed of or as it decays and the understory vegetation responds with vigorous new growth.

In particular, harvest of timbered areas adjacent to privately owned summer residences would affect the aesthetic qualities which attracted the homeowners to the area in the first place. The long-term restoration of the natural setting would probably occur too slowly to benefit the present homeowners.

Under Alternatives 1 and 2, about 6,700 acres of old-growth Douglas-fir, and about 12,200 acres under Alternative 3, would be harvested per decade. Opportunities for recreation in this habitat, such as wildlife and wildflower viewing, would thus be reduced throughout the unit and eliminated altogether from the harvested areas. As more old-growth Douglas-fir is harvested, the remaining areas would be subject to increased recreation pressure which, in turn, would result in decreased opportunities for solitude-type of recreation experience, as well as possibly degrading the habitat itself.

Development of new roads would provide increased access to forest areas for hunters, fishermen, and hikers, among others. Off-road-vehicle use would also increase. Continued and increased use of unpaved roads during wet weather could damage road surfaces and drainage structures, resulting in increased erosion. Closing of some of the roads temporaily to limit erosion would also tend to increase opportunities for dispersed recreation.

Opportunities for viewing and hunting wildlife would be enhanced by timber harvest because the forest canopy would be opened. Grass and forb production would increase which would lead to increased populations of mid-successional wildlife species such as deer. Opportunities for viewing wildflowers would likewise increase, both in terms of numbers and varieties.

Cultural Resources

Based on the results of the inventory sample, it is estimated that 571 cultural resource sites may be found on the 82,279 acres of land in the available timber production base. Numerous unidentified sites probably exist. Any timber management practice would have impacts on unidentified cultural resources due to compaction of soil, disturbance of ground surface, and alteration of the soil's chemical properties by fire, chemical treatment, or addition of organic matter. Ground disturbance could be expected to cause extensive artifact loss, breakage, and churning. The disruption of vertical and horizontal relationships of cultural deposits would permanently degrade the aesthetic, recreational, interpretive, and educational values of the sites. The degree of the impact would depend on the extent of the disturbance. For example, road construction on hillsides would cause relatively deep disturbance, while mechanical site preparation would cause a shallower disturbance over a broader area. Quantification of the impacts on unidentified cultural resource sites is not possible.

New roads into areas of archaeological, paleontological, and historic value would improve access for vandals and looters. Unauthorized collection by participants in timber management operations could also add to the loss of archaeological and historic values.

One beneficial impact of timber operations would be that surface disturbance might reveal archaeological and historic resources that would not otherwise be located.

Potential impacts would not be fully mitigated by salvage of cultural resources because salvage itself could be considered an unavoidable adverse impact. Once a site is excavated for any reason, it could be precluded from future research considerations using new or more refined techniques. Salvage is rarely as effective as nonsalvage research-oriented programs, partly because of time and funding limitations. Emergency salvage, which would be required by unexpected discoveries during project implementation, would be even less effective.

Land Use

Timber Resources

The timber harvest that can be sustained from any forest depends upon three factors:

- The amount of forest area that is suitable and available for timber production.
- The productive capacities of the land.
- The intensity of timber management.

In the short term, the cutting level also depends upon the amount of merchantable volume immediately available for harvest.

Alternative 1 (Preferred Alternative)--Intensive Timber Management

The land base available for timber production under this alternative would be reduced from previous estimates. This reflects the improved data base and procedures for multiple-use planning. The commercial forest land base has been reduced because of consideration given to the following: (1) physically fragile sites; (2) reforestation problem areas; and (3) some forest lands identified in an MFP for non-timber uses. However, future timber production would be expected to increase over present volume because management efforts would be intensified on the reduced commercial forest lands base. The long-term future timber production would approach the maximum sustainable yield for this land base as all stands approach optimum stocking and a perfect normal age class distribution as in a well-regulated forest.

Alternative 2--Limited Investment with Multiple-Use Constraints

Although the available timber production base would be the same under this alternative as under Alternative 1, the long-term timber productivity would be about 16 percent lower under this alternative because precommercial and commercial thinning would not occur.

Alternative 3--Continue Present Management (No Action)

A land base of 105,706 acres available for timber production was used to develop Alternative 3. This area estimate was based on the expansion of plot data gathered during the extensive forest inventory completed in 1975. The 1979 refined intensive inventories and improved multiple-use plans used to develop Alternatives 1 and 2 indicate that the 1975 estimate was incorrect. A land base of 82,279 acres available for timber production is more accurate. The 1975 inventory inadequately sampled the multiple-use constraints which limit timber harvest. The result was the over-estimation of the available timber production base and the concomitant over-estimation of the allowable cut. This error does not automatically mean that multiple-use values and elements of environmental concern would be impacted differently than Alternative 1. Protection of these values would be assured by the site-specific environmental assessments made prior to implementation of any timber management action. The effect of the greater allowable cut would be to accelerate the cutting of the growing stock. If this action resulted in overcutting, it would be detected by the periodic re-inventory. Adjustments in the allowable cut would be made to correct the error before the impact on the growing stock became too great.

Alternative 4--No Timber Management

This alternative contemplates no planned timber harvest from, or other timber management on, BLM-administered lands in SYU-15. Without such management, the regeneration of the forest would be expected to develop slowly through natural successional stages, where the land is dominated first by grass and forbs, then by brush, and finally by trees.

As the forest changes from its present conditon to an old-growth, mature forest, buildup of forest debris and standing dead trees would increase the chances for wildfires and insect and disease problems. Any necessary forest protection (e.g. firefighting) would be difficult because of the lack of access.

Social and Economic Conditions

No significant adverse impacts on employment or income would be incurred with implementation of Alternative 1 (Preferred Alternative). The market fluctuations in the timber industry do affect rates of employment, particularly in wood processing and manufacturing; however, this would not result from implementation of the proposed program. On the other hand, there would be some beneficial effects on employment. Approximately

58 jobs would be created or maintained annually as a direct result of the timber management program outlined in Alternative 1. This would be an increase of 13 jobs compared to the level of harvest over the past five years (8.4 MMBF/year). Indirect employment, that is services performed for employees in the timber industry, would also be created. This would amount to about 253 jobs, or 0.1 percent of employment regionwide. Impact on the regional economy of implementing any alternative would be insignificant due to the small volume of timber involved when compared to the total volume processed by the forest products industry.

The preferred timber management program (Alternative 1) would provide $66,000 to the State of California each year through the 4 percent revenue sharing of timber sale receipts. This revenue in the past has been very unstable due to shifts in market conditions and the inability of BLM to maintain an active management program. The difference in revenue to the State would vary $76,000 per year between Alternatives 3 and 4. Total sale value under Alternative 1 would be $1,644.000 on an annual basis, assuming 1979 prices.

The cost of implementing the preferred timber management program would be about $855,000 per year, including $396,000 for contracted forest development projects--site preparation, planting, fertilization (20 acres/year), and precommercial thinning. Using a per capita income of $6,000 (BLM, SYU-15 Socio-Economic Profile, 1978) approximately 66 jobs would be provided on a yearly basis. Since most of these jobs would be seasonal, substantially more workers would be employed for shorter periods of time. An estimated 27 jobs in BLM would be required to operate the timber program.

Table 4-2 shows forestry program costs for each alternative, including the Preferred Alternative. Also shown are economic benefits which would result through program implementation. Timber revenues have been adjusted upward 2.25 percent to account for increases above the general price level. Alternative 3 would result in the greatest economic return in the form of public revenues and Alternative 4 the least. Under Alternative 2 the government would gain approximately $1.75 for each dollar invested versus $1.92 for Alternative 1. From an economic efficiency standpoint, all alternatives would have positive revenue/cost ratios.

The Preferred Alternative would have a generally favorable impact on local public attitudes and expectations about BLM timber management. People expect an environmentally sound program which would, at the same time, provide monetary benefits to the local and regional economy. Despite the general agreement, however, there are specific actions proposed which would be disagreeable to some people.

The variety of recreational values and the broad array of timber management practices would make some land-use conflicts inevitable. Although some recreational activities may benefit from the timber management program, others would not. Quite often a practice may be both beneficial and detrimental, depending upon the user's point of view.

TABLE 4-2

COMPARISON OF ANNUAL ECONOMIC EFFECTS OF TIMBER MANAGEMENT ALTERNATIVES 1/

Alternative	BLM Timber Sales (MMBM) -	BLM Timber Sale Revenues ($) 2/	Forestry Program Costs ($) 3/	Net Revenues ($)	Revenue/ Cost Ratio	Payments to state of California ($)	BLM Forestry Jobs	Maximum Regional Employment Jobs	Maximum Regional Employment Percent
1	11.9	1,644,000	855,000	789,000	1.92	66,000	27	253	0.1%
2	10.6	1,464,000	837,000	627,000	1.75	59,000	24	226	0.1%
3	13.9	1,920,000	1,041,000	879,000	1.84	77,000	32	305	0.1%
4	.2-.3	35,000	10,000	25,000	3.50	1,000	2	5	0.1%

1/ Based on annual projected revenues and costs for the period FY 1980-84. A weighted average is used for the remainder of the decade. It is assumed that revenues will increase faster than costs (2.25% per year) due to increasing demand and availability of supply.

2/ Based on an average stumpage value of $132.08 per MBF for all sales during 1979.

3/ Management and forest development costs not included as part of the timber sale contract (i.e., site preparation, mechanical slash disposal, planting, fertilization, and precommercial thinning). Costs incurred for logging such as felling and bucking, lopping and burning and road construction are reflected in the stumpage price received for timber.

For example, most persons who relate to forests in terms of the recreational opportunities would favor additional roads and access to recreational areas. Providing such access would reinforce some recreational values associated with the forests. Wilderness advocates and some hunters, however, would view additional roads as potential threats to natural habitats.

Those who value the forest's beauty and clean air and water would oppose forest management practices that affect the aesthetic values of the land, e.g., group selection, scarification, and precommercial thinning. Rural development may be slowed in, relocated away from, or avoided near degraded viewsheds. Timber harvest operations may complicate or disrupt local lifestyles. The area may become less appealing if it is perceived to have lost its aesthetic appeal and simplicity of life. Although specific impacts would depend on the location of the action, salvage cutting and forest regeneration effects would probably be accepted. Alternative 4 in this case would likely be favored by the local populace.

Since 80 percent of the timber in SYU-15 would be harvested using selective cutting techniques, adverse public reaction from private landowners would not be expected to be great. Selection of any alternative, however, may increase the underlying conflict between economic interest and aesthetic or recreational interests. In summary, the impacts of specific treatments on personal and community values would depend in part on the locations of treatment applications, the manner in which BLM would communicate and negotiate its actions with affected residents, and the adaptability of those who would be affected.

The accident rate would not be expected to increase as a result of management proposed under any of the alternatives, either regarding workers as a result of harvesting operations or the public because of increased traffic on logging roads during these operations.

Impacts on human health resulting from proposed use of herbicides on 100 acres are related to the possibility of exposure to these herbicides and to their toxicity. Exposure to herbicides could be direct, as in the case of workers applying the herbicide. The number of people that could be directly affected would be small. Indirect exposure, for example contact with a contaminated stream, would be more likely to occur. The most likely cause of stream contamination would be drift from spray areas. Project design features incorporating buffer zones adjacent to streams, however, would minimize this impact.

In addition to the unlikelihood of exposure, adverse effects from these herbicides would be minimal because they are relatively non-toxic to humans. The toxicity rating of 2,4-D and Atrazine (the proposed chemicals) is "4" or "slightly toxic" (U.S. Dept. Int., BLM, 1978). It is estimated that one ounce to one pint would have to be ingested to prove lethal to a 150-pound man.

Summary

Allowable cut levels under Alternatives 1, 2 and 3 would vary between 10.6 MMBF and 13.9 MMBF. These alternatives would all have essentially the same impacts on social and economic conditions.

Because of the the small contribution to regional employment, the gross regional population would not be impacted. Likewise, no forest products mills would be adversely impacted, as BLM contributes less than 1 percent of the total timber harvest.

The no timber management alternative would allow for some salvage harvest. Timber harvesting would vary year to year based on pest control problems, fire salvage, etc. This alternative would not provide a dependable source of timber to the forest products industry for building materials. Lumber prices under this action would not increase because of the small volumes proposed for harvest. Some jobs would be lost in the long-term and timber sale revenues of nearly $1,000,000 would not be received by the Federal Government as compared to Alternative 1, 2 or 3.

Energy Consumption

Table 4-3 shows the energy investment required to implement the proposed action and other alternatives, expressed in British thermal units (Btu's). Alternative 3 (No Action--Continue Present Management) would require the greatest energy expenditure and Alternative 4 the least. The amount of energy needed would be proportional to the level of harvest and type of treatments proposed. The estimated cost per unit and assumed energy requirement per dollar of cost are based on figures in the environmental impact statement on the Ten-Year Timber Management Plan for Jackson and Klamath Sustained Yield Units (U.S. Dept. Int., BLM, 1979).

Alternative 1, the Preferred Alternative, would be considered energy intensive, based on the type of equipment employed and the level of treatments included. The annual energy consumption attributable to Alternative 1 would be 98.5 billion Btu's, or an energy equivalent of 785,000 gallons of gasoline. This estimate is based on 125,563 Btu's per gallon of gasoline. Assuming 1980 fuel prices for gasoline of $1.25 per gallon, the cost of energy required to implement the proposal would be approximately $980,000. Of this total, 94 percent would be the costs associated with road development and maintenance and with log production. The remaining 6 percent would be costs of management practices associated with sustaining the timber production level.

TABLE 4-3

Comparison of Energy Consumption

Alternative 1
(Preferred Alternative)

Treatment	Units	Estimated Cost per Unit ($)	Assumed Energy Requirement Per $ of Cost (1,000 Btu's)	Energy Consumption (1,000,000 Btu's)
ROADS				
Construction	112 miles	13,876	80	124,329
Surfacing	40 miles	22,636	50	45,272
Maintenance	1270 miles	397	54	27,226
LOG PRODUCTION (all actions taken to cut trees and get logs to the mill)	119,000 MBM	100	55	654,500
SLASH DISPOSAL				
Mechanical	1340 acres	145	31	6,023
Lopping	12410 acres	15	20	3,723
Piling and Burning	1340 acres	100	31	4,154
HERBICIDE				
Site Preparation and spraying	1380 acres	59	122	9,933
MECHANICAL SCARIFICATION	7120 acres	112	100	79,744
PLANTING	11,130 acres	74	31	25,532
THINNING				
Precommercial	850 acres	127	31	3,346
Commercial	6,336 acres	(included with log production)		
FERTILIZATION	200 acres	75	122	1,830
TOTAL				985,612

NOTE: BLM estimated costs per units were often a range of values. The listed costs were elected as indicative of SYU-15 area-wide. Similarly, DOE energy requirements were also given as a range in some cases.

Sources: BLM data, except for "Assumed Energy Requirements per Dollar of Cost," which was derived from data furnished by Frank Brown, U. S. Department of Energy, Region X as published in the Jackson-Klamath Sustained Yield Unit Timber EIS.

TABLE 4-3

Alternative 2

Treatment	Units	Estimated Cost per Unit $	Assumed Energy Requirement Per $ of Cost (1,000 Btu's)	Energy Consumption (1,000,000 Btu's)
ROADS				
Construction	112 miles	13,876	80	124,329
Surfacing	40 miles	22,635	50	45,272
Maintenace	1270 miles	397	54	27,226
LOG PRODUCTION (all actions taken to cut trees and get logs to the mill)	106,600 MBM	100	55	583,000
SLASH DISPOSAL				
Mechanical	988 acres	145	31	4,441
Lopping	7,900 acres	15	20	2,370
Piling and Burning	988 acres	100	31	3,063
HERBICIDE				
Site Preparation and spraying	1,470 acres	59	122	10,581
MECHANICAL SCARIFICATION	7,590 acres	112	100	85,008
PLANTING	12,509 acres	74	31	28,696
THINNING				
Precommercial	-0-	-0-	-0-	-0-
Commercial	-0-	-0-	-0-	-0-
FERTILIZATION	-0-	-0-	-0-	-0-
TOTAL				913,986

TABLE 4-3

Alternative 3

Treatment	Units	Estimated Cost per Unit $	Assumed Energy Requirement Per $ of Cost (1,000 Btu's)	Energy Consumption (1,000,000 Btu's)
ROADS				
Construction	170 miles	13,876	80	188,714
Surfacing	70 miles	22,665	50	79,328
Maintenance	1290 miles	397	54	27,655
LOG PRODUCTION (all actions taken to cut trees and get logs to the mill)	139,000 MBM	100	55	764,500
SLASH DISPOSAL				
Mechanical	1780 acres	145	31	8,001
Lopping	15,830 acres	15	20	4,749
Piling and Burning	1,780 acres	100	31	5,518
HERBICIDE				
Site Preparation and Spraying	1,600 acres	59	122	11,517
MECHANICAL SCARIFICATION	8,220 acres	112	100	92,064
PLANTING	14,400 acres	74	31	33,034
THINNING				
Precommercial	1,630 acres	127	31	6,417
Commercial				
FERTILIZATION	200 acres	75	122	1,830
TOTAL				1,223,327

TABLE 4-3

Alternative 4

Treatment	Units	Estimated Cost per Unit $	Assumed Energy Requirement Per $ of cost (1,000 Btu's)	Energy Consumption (1,000,000 Btu's)
ROADS				
Construction	Nominal	-0-	-0-	-0-
Surfacing	-0-	-0-	-0-	-0-
Maintenance	Nominal	-0-	-0-	-0-
LOG PRODUCTION (All actions taken to cut trees and get logs to the mill)	2,500 MBM	100	55	13,750
SLASH DISPOSAL				
Mechanical	-0-	-0-	-0-	-0-
Lopping	-0-	15	20	-0-
Piling and Burning	-0-	100	31	-0-
HERBICIDE Site Preparation and spraying	-0-	-0-	-0-	-0-
MECHANICAL SCARIFICATION	-0-	-0-	-0-	-0-
PLANTING	Nominal	-0-	-0-	-0-
THINNING Precommercial Commerical	-0-	-0-	-0-	-0-
FERTILIZATION	-0-	-0-	-0-	-0-
TOTAL				13,750

Unavoidable Adverse Impacts

Road construction and maintenance under Alternatives 1, 2, or 3 would result in both temporary and permanent soil disturbance. Timber harvest would result in minor increases in soil compaction. Some loss of soil fertility would be expected from slash burning.

Removal of old-growth timber stands would adversely affect animal species, such as pine marten, fisher, and northern spotted owl, among others, which depend on this habitat. Secondary succession would occur, resulting in different habitats, primarily benefiting species such as deer, small rodents, and small birds.

Timber harvest would also result in some minor temporary reduction in scenic quality on or near roads and recently harvested areas. Periodic traffic noises and noise resulting from the timber harvest operations themselves would temporarily affect recreationist and nearby residents.

Air quality would be temporarily degraded in the fall during slash burning. Dust would be created by road construction and timber harvest, as well as by use of the road for non-timber-related activities (for example, recreation) during dry weather.

Road construction and logging activities can be expected to contribute to some temporary increase in turbidity levels of streams in SYU-15. Increased recreation use on areas made more accessible by construction of roads would increase the possibility of water-quality degradation. An increase in recreation would also increase the possibility of man-caused fires.

There would be some damage to unknown historical or archaeological sites, although the location of many sites is already documented, and each new project evaluation will require reconnaissance for other identifiable sites.

SHORT-TERM USES VERSUS LONG-TERM PRODUCTIVITY

The time frame of the proposed action, which is considered the short-term, is for the 10-year period 1975-84. At that time, a new inventory, new multiple-use considerations, re-evaluation of management practices, and current public involvement will produce a revised allowable cut for the new 10-year period. "Long-term" is defined as that time beyond the initial 10-year preferred alternative time period. In computing the level of timber harvest for SYU-15, all volumes and forest practices were projected for a 400-year period. This was done to assure that all lands could be productive at the proposed level for 400 years.

In the short-term, Alternatives 1, 2, and 3 would increase timber productivity on commercial timber lands within SYU-15 by replacing understocked, poorly growing stands with young, well-stocked stands. Approximately 13 million board feet per decade would be added to the allowable cut as a result of proposed intensive management practices. At the end of the ninth decade the 10-year cut could be raised to approximately 180 million board feet as a result of these intensive management practices. However, because Alternative 2 does not include thinning, this increase in growth would not occur.

Logging activities would inevitably cause some soil erosion and compaction of soil. The resultant long-term loss in soil productivity, as a result of compaction would be minimized by project design features, but soils would not recover under natural conditions for 35 to 40 years. The construction of 112 miles of permanent roads would lower long-term productivity during the 10-year period. Sediment accumulation in small stream reaches, as a result of road construction and management activities, would lower water quality immediately after logging. Soil conditions would stabilize within one to three years after revegetation.

Under regulation, 82,279 acres of the existing timber production base would be cut and converted to young stands. Conifer species would be managed on 90-year old rotations. During the first decade, approximately 6,700 acres of old-growth (more than 200 years old) and mature timber would be partially cut. Early stages of succession would be favored, enhancing habitat for deer, small mammals, and birds. On the other hand, the removal of many snags and dead trees would reduce habitat for cavity users. Species dependent on old-growth conditions, such as the spotted owl, goshawk, red tree mouse, red-backed mouse, pine marten and fisher, would suffer loss of habitat.

Loss of old-growth timber from these areas would also change the aesthetic resource. Road construction would provide a long-term disruption. However, the resultant variation in visual features in the managed forest would, in some cases, enhance appeal for the background or foreground viewer.

Impacts on cultural resources could occur in the short and long terms. Site-specific assessments will be prepared to mitigate impacts on prehistoric and historic features.

The timber program under any of the alternatives would not have a significant impact on local and regional economics. Alternatives 1, 2, or 3 would, however, provide net annual revenues of approximately $1,000,000 to the U.S. Treasury and have a slightly favorable short-term impact on employment associated with wood supply. These benefits would increase proportionally as the volume sold approaches maximum potential long-term yields. These yields would result in a 53% increase in timber sale revenues under the Preferred Alternative. Alternative 3 would be most beneficial from an employment and receipt standpoint, due to higher harvests in the short-term. This would be at the expense of growing stock necessary to sustain the yield at a non-declining rate.

The long-term effects of intensive timber management would result in a forest where the majority of acres would be under management by Man. For those members of society who do not prefer this type of administration on public lands, this would be a long-term adverse effect.

In terms of the greatest sustainable timber harvest in harmony with multiple-use considerations identified by the MFP, Alternative 1 has the greatest potential. A comparison of the short-term versus long-term impacts of the alternative management proposals on the sustained timber production of the forest is shown in Tables 4-4 and 4-5.

IRREVERSIBLE AND IRRETRIEVABLE COMMITMENT OF RESOURCES

This section identifies the extent to which the Preferred Alternative would irreversibly limit the potential use of the land and resources. The term "irreversible" means incapable of being returned to its original state. "Irretrievable" means a resource or value that cannot be replaced.

Most resources affected in the short term by timber management activities are renewable and do not involve an irreversible commitment. However, completion of the timber access road system would be a long-term commitment of 405 acres of public land that otherwise might be used for wildlife habitat, range, or timber growing.

Approximately 844 acres of commercial forest would be converted to early successional stage communities within 6,700 acres of old-growth Douglas-fir and conifer community types which would be irretrievably committed to logging operations in the first decade. Some unidentified endangered plant species could be lost, directly through logging, road construction or herbicide application or indirectly through habitat changes. Site-specific EAs will address this problem.

Cavity-nesting species would be irreversibly impacted as snags and potential snags would be reduced on approximately 82,000 acres. Habitat for old-growth-dependent species would be degraded on about 6,700 acres during the first decade. This acreage would never again provide the same quality old-growth habitat under proposed management plans (Alternatives 1, 2 or 3).

TABLE 4-4

COMPARISON OF SHORT-TERM USES VERSUS LONG-TERM TIMBER YIELD

Alternative	Short-Term yield (first decade)	Long-Term Yield (120 to 400 years hence)
1 -Intensive Timber Management with Multiple-Use Constraints (Preferred Alternative)	A 16% increase in sustainable timber production is realized from thinning as compared to Alternative 2.	A maximum potential increase of 29.6% in timber production is possible from thinning. This would be realized gradually after the critical point is passed after the ninth decade. At this time the cut could be raised to approximately 182 million board feet per decade.
2 - Limited Investment With Multiple-Use Constraints	No increase in timber production is expected without thinning treatments.	No increase in productivity is projected without thinning treatments.
3 - Maintain Present Management Program (No Action)	The higher harvest level is more attractive to the timber interests but this level of production is not sustainable.	The maximum harvest level attainable could not exceed the maximum level of Alternative 1. Any attempt to exceed that level would violate the non-declining flow of timber criteria of the allowable cut plan.
4 - No Timber Management Program	No increase in timber harvest is possible. Standing volume of the forest increases.	The net annual growth rate of the forest decreases as the forest becomes overcrowded. Net growth eventually reaches zero when growth and decay are equal.

Damage to or destruction of any archaeological or historic site would be irreversible and irretrievable. Knowledge lost as a result would be permanent. The potential of the undisturbed sites and their settings to provide interpretive, educational, recreational, and aesthetic opportunities would decrease.

The energy investment of the proposal (98.5 billion Btu's) constitutes an irretrievable reduction of dwindling supplies of petroleum-derived energy. This amount is relatively minor compared to the scope of the total national forestry program.

Based on operating cost, implementation of the proposal is expected to require approximately $855,000 per year. This includes planning, layout and administration of timber sales and contract costs and administration of forest development projects.

Table 4-5

Short and Long-Term Comparison of Economic Effects of Timber Management Alternatives[1/]

	Timber Sale Revenues Alternative 2/				Forestry Program Costs Alternative				Net Revenues Alternative				Present Net Worth @ 5% 3/ Alternative			
Decade	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
1 1975-79 1980-84	3,766,639 8,220,451 11,987,000	3,766,639 7,322,419 11,089,000	3,766,639 9,602,039 13,369,000	3,766,639 172,699 3,939,000	1,872,845 4,272,720 6,146,000	1,872,845 4,184,470 6,057,000	1,872,845 5,204,280 7,077,000	1,872,845 48,255 1,921,000	1,893,794 3,947,731 5,841,000	1,893,794 3,137,949 5,032,000	1,893,794 4,397,759 6,292,000	1,893,794 124,444 2,018,000	1,893,794 3,402,830 5,297,000	1,893,794 2,703,341 4,597,000	1,893,794 3,789,906 5,684,000	1,893,794 107,429 2,001,000
2	12,257,000	11,339,000	N/A	N/A	5,106,000	4,262,000	N/A	N/A	7,151,000	7,077,000	N/A	N/A	4,390,000	4,345,000	N/A	N/A
3	12,533,000	11,594,000	N/A	N/A	6,400,000	4,608,000	N/A	N/A	6,133,000	6,986,000	N/A	N/A	2,312,000	2,633,000	N/A	N/A
4	12,815,000	11,855,000	N/A	N/A	5,777,000	4,446,000	N/A	N/A	7,038,000	7,409,000	N/A	N/A	1,629,000	1,714,000	N/A	N/A
5	13,103,000	12,121,000	N/A	N/A	6,118,000	4,459,000	N/A	N/A	6,985,000	7,662,000	N/A	N/A	992,000	1,088,000	N/A	N/A
6	13,398,000	12,394,000	N/A	N/A	6,460,000	4,184,000	N/A	N/A	6,938,000	8,210,000	N/A	N/A	605,000	716,000	N/A	N/A
7	13,699,000	12,673,000	N/A	N/A	5,397,000	4,199,000	N/A	N/A	8,302,000	8,474,000	N/A	N/A	444,000	453,000	N/A	N/A
8	14,007,000	12,958,000	N/A	N/A	4,915,000	4,307,000	N/A	N/A	9,092,000	8,651,000	N/A	N/A	299,000	285,000	N/A	N/A
9	14,323,000	13,250,000	N/A	N/A	5,439,000	4,243,000	N/A	N/A	8,884,000	9,007,000	N/A	N/A	179,000	182,000	N/A	N/A
Total	118,122,000	109,273,000	---	---	50,697,000	40,765,000	---	---	66,364,000	68,508,000	---	---	16,147,000	16,013,000	---	---

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1/ This economic comparison is taken to the 9th decade or "critical point" at which time allowable cut levels could be gradually increased to 182 million board feet per decade for alternative 1.

2/ Assumes a 2.25 percent rise in stumpage value above inflation (costs) due to an increase in demand and as resources become more scarce. (Source: The 1980 Report to Congress on the Nation's Renewable Resources, U.S. Forest Service, June 1980).

3/ Discount rate of 4.6 percent is used by OMB and U.S. Forest Service in determing Present Net Worth.

Chapter 5

CONSULTATION AND COORDINATION

INTRODUCTION

The SYU-15 Timber Management Draft Environmental Assessment (DEA) was released for public review in September 1980. A letter accompanying the DEA solicited comments for a 30-day period, which ended October 17, 1980.

About 145 copies of the DEA were mailed to Federal, State and local government agencies, private groups, organizations, and individuals for comment.

Comments received in letters during the public review period which presented new data, questioned findings of analyses or raised questions or issues that related directly to the adequacy of the FEA were responded to and were used for text revision. No response was given those comments which did not provide additional information or present factors for additional analyses. The comments are numbered in a two-number system. The first number represents the transcript or letter while the second number represents the comment.

Letter Index No.	Letter Received From
1	Regional Office, California Archaeological Site Survey, Sacramento, CA
2	U.S. Department of Agriculture, Soil Conservation Service
3	Regional Office, California Archaeological Site Survey, Fresno, CA
4	Wildlife Society, Western Section Sacramento Chapter
5	The Resources Agency of California
6	Heritage Conservation and Recreation Service, Pacific Southwest Region
7	United States Forest Service, El Dorado National Forest

Comment Letters and Responses -- on following pages

DEPARTMENT OF ANTHROPOLOGY
CALIFORNIA STATE UNIVERSITY, SACRAMENTO
6000 "J" STREET
SACRAMENTO, CALIFORNIA 95819

REGIONAL OFFICE
CALIFORNIA ARCHEOLOGICAL SITE SURVEY

EL DORADO AMADOR PLACER SUTTER
SACRAMENTO YUBA NEVADA SIERRA
COLUSA SOLANO YOLO

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	AM III		

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FOLSOM DIST. OFFICE
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September 25, 1980

Alan Thomson
District Manager
Bureau of Land Management
63 Natoma Street
Folsom, CA 95630

RE: REVIEW AND COMMENT ON DRAFT SYU-15 TIMBER MANAGEMENT ENVIRONMENTAL ASSESSMENT (EA). CULTURAL RESOURCES

Dear Mr. Thomson,

Thank you for giving us the opportunity to review this document, we are anxious to be kept informed of any activities which involve cultural resources.

We consider the statements on pages 3-20 and 4-21 to be accurate and to cover the most critical areas of concern. It is a fair, if very generalized, assessment of the potential resource base and possible impacts by timber operations.

1-1 This assessment is but the first step in cultural resource management and it seems appropriate that a brief outline of the proper management procedures, to be following on specific areas to be affected, should be included. Basically these would include:

1) Inventory and preliminary evaluation
2) Mitigation and/or Preservation measures
3) Documentation of data recovery
4) Follow-up inspection of resources

These should be considered minimum requirements in bare outline form to be used only as a baseline for management. Inclusion of such a statement or outline would hopefully assure interested parties that the Bureau has every intention of protecting our cultural resources to the best of its ability.

Thank you again and if we can be of any further assistance please feel free to call us at (916) 454-6217.

Sincerely,

Marianne Russo

Marianne L. Russo
Assistant Regional Officer

RESPONSE:

1-1	Mitigation measure #33 on page 2-29 has been revised to reflect your concern. Follow-up inspections will be conducted to determine the effectiveness of protection measures stipulated in site specific environmental assessments.

United States
Department of
Agriculture

Soil
Conservation
Service

2828 Chiles Road
Davis, CA 95616
(916) 758-2200

②

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October 7, 1980

Mr. Alan Thomson, District Manager
Bureau of Land Management
63 Natoma Street
Folsom, California 95630

Dear Mr. Thomson:

The Soil Conservation Service has reviewed the Draft Environmental Assessment of the Timber Management Program for Sustained Yield Unit 15. You are to be complimented for the preparation of an excellent document, thoroughly researched.

2-1 We find no controversial items in the report within the realm of our expertise and responsibilities. There appears to be no conflict with any SCS ongoing or planned programs or projects. Only one point of concern was not mentioned. We feel a statement to the effect that no prime land is involved in the alternatives needs to be included either with the Soils or Land Use discussions.

We appreciate this opportunity to review and comment on this environmental assessment.

Sincerely,

FRANCIS C. H. LUM
State Conservationist

cc: Norman Berg, Chief, SCS, Washington, D.C.

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The Soil Conservation Service
is an agency of the
Department of Agriculture

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RESPONSE:

2-1	A sentence has been added on page 3-23 stating that no prime or unique farmlands will be impacted by the proposed action or alternatives.

③

California Archaeological Site Survey
Regional Office
FRESNO
KINGS
MADERA
TULARE

Archaeology Office
California State University, Fresno
Fresno, California 93740
(209) 487-2018

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October 13, 1980

Mr. Alan P. Thomson
Bureau of Land Management
Folsom District Office
63 Nevada Street
Folsom, CA 95630

Dear Mr. Thomson:

Thank you for submitting the draft SYU-15 Timber Management Environmental Assessment. We have read the draft sections pertaining to cultural resources and find their assessment adequate.

Sincerely,

DUDLEY M. VARNER, PH.D.
REGIONAL OFFICER

Karin O'Neil /kc

Karin O'Neil
Regional Office Assistant

KO:kc

THE WILDLIFE SOCIETY

WESTERN SECTION SACRAMENTO CHAPTER

Fred Meyer, president, 1980
Ca. Dept. Fish and Game, Region 2
1701 Nimbus Road
Rancho Cordova, CA 95670

④

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4

Mr. Alan P. Thomson, Di
Bureau of Land Management
63 Natoma St.
Folsom, CA 95630

Dear Mr. Thomson:

The Sacramento chapter of the Wildlife Society has reviewed the draft Timber Management Environmental Assessment for Sustained Yield Unit 15, August, 1980. We agree with your selected preferred alternative but suggest that two requirements for roads be improved for the benefit of wildlife and the prevention of soil erosion.

4-1 New road cuts and major skid trails should all be seeded and fertilized to create as good a grass and forb cover as possible. Mitigation measure #5, page 2-22, contains too many "ifs". The local manager drawing up the specifications for a timber sale should have a clear directive to seed disturbed areas to realize potential wildlife benefits and prevent soil erosion and stream degradation.

4-2 All new roads and major skid trails should be closed to vehicular traffic at the completion of timber harvest unless some overriding consideration favors putting in a locked gate or keeping the road open and maintained. Mitigation measure #21, page 2-26 is not adequate. Significant wildlife values could be lost before "harassment and poaching of wildlife is evident".

We are pleased to note the consideration given to wildlife in the assessment and appreciate the opportunity to present our views.

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Sincerely,

Fred Meyer

Fred Meyer, president

RESPONSE:

4-1 Experience has shown that small areas of disturbance on gentle slopes revegetate rapidly under natural conditions. Larger and steeper areas, on the other hand, can benefit by seeding and fertilizing to create grass and forb cover. In these instances, the rapid establishment of understory species can reduce soil erosion and prevent stream degradation, as well as provide food for wildlife. Areas to be seeded and fertilized will be identified in site specific environmental assessments.

4-2 As a general rule, all roads will be closed after use except where overiding considerations exist, i.e., need for access to a recreational development, fire control, etc. Mitigation measure 21 on page 2-26 is meant to serve where other measures have failed to adequately protect wildlife from poaching and harassment.

Resources Building
1416 Ninth Street
95814

(916) 445-5656

Department of Conservation
Department of Fish and Game
Department of Forestry
Department of Boating and Waterways
Department of Parks and Recreation
Department of Water Resources

EDMUND G. BROWN JR.
GOVERNOR OF
CALIFORNIA

Air Resources Board
California Coastal Commission
California Conservation Corps
Colorado River Board
Energy Resources Conservation
and Development Commission
Regional Water Quality
Control Boards
San Francisco Bay Conservation
and Development Commission
Solid Waste Management Board
State Coastal Conservancy
State Lands Commission
State Reclamation Board
State Water Resources Control
Board

THE RESOURCES AGENCY OF CALIFORNIA
SACRAMENTO, CALIFORNIA

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OCT 15 1980

Mr. Alan P. Thomson
District Manager
Bureau of Land Management
63 Natoma Street
Folsom, CA 95630

Dear Mr. Thomson:

The State of California has reviewed the Timber Management Assessment, Sustained Yield Unit 15, submitted through the Office of Planning and Research in the Governor's Office.

The State's review, in accordance with the provisions of Part II of Office of Management and Budget Circular A-95, was coordinated with the Departments of Conservation, Forestry, Fish and Game, Parks and Recreation, Water Resources, and Transportation; the Air Resources and State Water Resources Control Boards; and the State Lands Commission.

The Department of Fish and Game (DFG) comments that BLM should revise this report in three major areas: alternatives, description of project impacts on fish and wildlife, and proposed mitigation measures. DFG also has some concern with the proposed harvesting of "old growth" forests. The following comments discuss these items in more detail.

Alternatives

5-1 Table 2-4 (page 2-38) suggests that the preferred plan is heavily oriented toward the production of timber, even though this is not cost effective. The preferred plan would very likely be even less cost effective if it identified all of the project's impacts to fish and wildlife and provided adequate mitigation. This suggests that BLM should develop another alternative that better considers all renewable resources.

⑤

Project Impacts

5-2 DFG believes that the report is inadequate in its assessment of impacts upon fish and wildlife resources. BLM's emphasis on endangered wildlife and deer winter range is too narrow a scope, and fails to allow complete evaluation of fish and wildlife impacts. This is not consistent with NEPA or CEQA guidelines, which require the assessment of all project impacts. DFG believes that the report must be rewritten so that an accurate representation of project impacts is included.

Mitigation

5-3 The document does not adequately discuss acceptable mitigation measures to reduce the adverse impacts to an acceptable level as NEPA and CEQA require. The proposed mitigation for spotted owls is to leave small pockets of undisturbed timber where topography, economic considerations, or physical limitations of the yarding equipment prohibit their use. These pockets may not be located where spotted owls are nesting. Furthermore, the report indicates (page 3-17) that the spotted owls appear to require a territory of 300 acres or more. DFG believes that the mitigation proposed for this species is inadequate. If this program is implemented, there will no longer be any spotted owls on BLM land in SYU-15 in the near future.

5-4 The mitigation for road dust does not consider the adverse impact of drafting too much water from streams to abate dust. This situation was common during California's recent drought. In order to protect aquatic resources, BLM should revise this report to include alternatives to watering the roads for dust abatement.

5-5 Water quality mitigation measures are incomplete with respect to: buffer zones, road construction and logging in areas of erodible soils, and stream crossings.

The report only discusses buffer strips for permanent and some ephemeral streams. Also, the buffer strips are too narrow. DFG believes that there should be buffer strips on all permanent and intermittent streams, and on some ephemeral streams. The buffer should vary in width depending upon the percent slope and erodibility of the soil, but the minimum width should be 100 feet. There should be no equipment use in the buffer strips. End-lining or cable can be used for yarding.

⑤

5-6 Road construction in areas with erodible soils should not exceed eight percent slope. The road surface should be outsloped to prevent gullying, accelerated erosion, and sedimentation in the streams. Logging should not be conducted in areas of erodible soil the same year as road construction.

5-7 There are acceptable methods available to cross streams other than just bridges and culverts. DFG believes that culvert installation causes more harm than good in some situations.

"Old Growth" Forests

5-8 The report recognizes the importance of the "old-growth" forests to 69 species of wildlife. It also states that the private timber lands will not provide the old-growth forests in the future because there is no incentive for landowners to do so. This fact alone makes preservation of the isolated islands of "old growth" on public lands of critical importance to the protection of species dependent upon old-growth forests.

Even though there is an incentive for BLM to maintain the old-growth forests, the preferred alternative proposes the harvesting of this component. There are neither mitigation measures proposed, nor alternatives provided to maintain a viable population of the 69 dependent wildlife species.

Any questions regarding these comments should be directed to A. E. Naylor, Regional Manager, DFG, Post Office Box 1480, Redding 96099 or (916) 246-6511.

We greatly appreciate having been given an opportunity to review this report.

Sincerely,

James W Burns

JAMES W. BURNS
Assistant Secretary for Resources

cc: Office of Planning and Research
1400 Tenth Street
Sacramento, CA 95814
(SCH 80092202)

RESPONSES:

5-1 All alternatives, including the preferred alternative, are cost effective. Net annual revenues of $789,000 would be generated with implementation of Alternative 1.

The Management Framework Plan sets forth recommendations for land use allocations and resource management (including wildlife) for the total of 669,112 acres of public forest lands in Sustained Yield Unit 15. These recommendations were made following a comprehensive analysis of land use and resource management alternatives selected on the basis of best meeting the objectives of the unit. The objectives, alternatives, analysis and rationale for the recommendations are all documented in MFP narratives, maps, and overlays which are available in the respective District Offices. Tables D-1 and D-2 summarizes areas of conflict and tradeoffs made for wildlife in developing the preferred alternative.

5-2 To fullfill requirements of the National Environmental Policy Act of 1969 (NEPA), the BLM engaged in an early and open process for determining the scope of issues to be addressed in the Timber Management Environmental Assessment. Over 100 government agencies, interest groups and individuals were contacted to identify issues of public concern. On the basis of the scoping effort, five primary issues of concern were identified, including possible impacts on endangered wildlife species and critical deer winter range. More specific impacts on fish and wildlife will be addressed in environmental assessments of specific actions as described on page 1-1. The California Department of Fish and Game will be given the opportunity to review our site-specific environmental reports for each timber harvest project. Their comments and recommendations will be considered prior to any action involving fish or wildlife habitat.

5-3 It is incorrect to assume that implementation of an intensive timber management program would result in the complete elimination of the spotted owl from SYU-15. Although preliminary research in Oregon and California indicates the need for old-growth forests which meet habitat requirements, field observations also show that spotted owls may use second-growth evergreen forests if other habitat requirements are met. Observations in southwestern Oregon (Nietro, 1974) showed that spotted owls will utilize an area comprised of second-growth species if a closed forest canopy exists with interspersed old-growth trees for nesting. Also, in California Gould (1973) found that owls often occur in areas of old-growth Douglas-fir forests exhibiting crown closures of less than 40 percent. The need for further research exists but it does appear that the spotted owl can survive in less than optimal conditions.

The reservation of 40 percent of the timber base will undoubtedly provide some old-growth habitat for spotted owls, although the exact acreage is unknown at this time. Site-specific environmental assessments on individual timber sales will be prepared and where spotted owls have been observed , these EAs will analyze the results of past practices and future needs. Mitigation measures #24 (p. 2-27) for the spotted owl will include retention of the nest site or grove and establishment of protective zones around permanent water courses closest to the nest area. In addition, a one-half-mile no-disturbance zone will be maintained around nest sites from February through August. The BLM will defer planned timber sales for two years where owls have been sighted until nest sites are located and/or additional guidelines are developed.

5-4 Mitigation measures #4 and #25 on pages 2-21 and 2-27 have been changed to include the use of oil or other dust palliatives as alternatives to road watering to protect aquatic resources when drafting too much water from streams might be a problem. Permission to draft water from streams is not granted by the standard provisions of the timber sale contract. Water resources are protected by the standard timber sale contract provision Section 25(a) which states, "Purchaser shall comply with all applicable state and Federal laws and regulations pertaining to water quality in connection with any operations under this contract."

5-5 While stream buffers thus far identified on public lands vary between 120 and 500 feet in width, BLM's position regarding minimum buffer strip width is outlined in BLM Timber Sale Manual 5421.12A2:

"Neither an optimum nor a minimum width can be arbitrarily established for buffer strips. It is suggested however that a minimum width of 75 feet on each side of the stream be used as a guide for establishing buffer strips. At the same time it must be realized that the necessary width will vary with steepness of the terrain, the nature of the undercover, the kind of soil, and the amount of timber that is to be removed".

BLM is concerned about protection of aquatic and riparian habitat and will continue to work with CDF&G under cooperative agreements to identify any specific problem areas and develop adequate protection measures.

While identifying the timber management base identified stream buffers on all perennial streams as well as all intermittent streams which produce enough flow to provide spawning areas for trout or anadromous fish or carry heavy sediment loads to perennial streams. Streams omitted will be identified in site-specific environmental assessments to implementation of any action.

To protect against the inadvertent omission of these streams the following mitigation has been added to measure #25: The designation and width of "Streamside buffers . . . on all perennial and intermittent streams and on some ephemeral streams (will be) determined (through) site-specific environmental assessments . . . The minimum width will generally be 100 feet. No equipment will be used in the buffer strips. End-lining or cable yarding can be used to remove timber. See also Measures #4-7 and #12-14".

Mitigation measures on page 4-8 have been revised to be consistant with the above.

We reviewed the maps in Appendix C and found that a stream buffer designation was inadvertantly omitted on Patterson Creek in section 1B, T. 44N., R. 9W., M.D.M. The correction is indicated in the errata in the final EA.

5-6 We agree that most roads constructed under an 8 percent grade will not have excessive erosion problems. Limiting the grade to 8 percent, however, is too confining for universal use where other considerations may favor a steeper grade for a limited distance to avoid another problem. We prefer to consider the design of each road on its own merits and to address the impacts in site-specific environmental assessments.

Mitigation #5 on page 2-22 has been revised to include outsloping of roads.

Most of the unstable or erodible soils in SYU-15 have either been excluded from the timber production base or included subject to management restrictions. Table 2-1 shows 31,308 areas have been withdrawn due to fragility. Another 22,891 acres have been placed in a restricted category. BLM agrees that logging should not be conducted in highly erosive areas during the same year as road construction. Such areas will be identified in site-specific EA's.

5-7 We agree that stream crossing methods other than bridges and culverts are sometimes acceptable. These will be addressed on a case by case basis. Some BLM districts have regularly coordinated stream crossing plans with the Department of Fish and Game. We will expand this practice so CDF&G will have adequate opportunity to review and comment on stream crossing proposals to reduce harm.

5-8 Mitigation measures to maintain a viable population of "old-growth" dependent wildlife species will be identified on a case by case basis through site-specific environmental assessments. Measures may include the:

1. Retention of snags and rotten logs on areas to the extent allowed by fire management.
2. Reduction of disturbance by timing of harvest.
3. Protection of nest trees.

Timber stands are protected from harvest in areas excluded from intensive management such as stream buffers and critical watershed protection areas. These exclusions comprise 42 percent of the commercial harvest base. Although the proportion of "old-growth" in total in these areas is not known, this component will increase with time, providing a replacement habitat for dependent species. This will not, however, compensate for the loss of old-growth forest to be harvested over the planning period. Those species dependent upon old-growth forests will experience a possible unavoidable reduction in population levels.

The alternative of not timber harvest provides for increased old-growth forest and the proliferation of old-growth-dependent wildlife species.

United States Department of the Interior

HERITAGE CONSERVATION AND RECREATION SERVICE
PACIFIC SOUTHWEST REGION
SAN FRANCISCO, CALIFORNIA 94102
450 Golden Gate Avenue Box 36062

⑥

IN REPLY REFER TO:

PSW 200

DEPT. OF INTERIOR
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OCT 2 [illegible] 1980
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OCT 24 1980

Memorandum

To: District Manager, Bureau of Land Management, Folsom, California

From: Regional Director, PSWRO

Subject: Review of draft environmental assessment Timber Management Program for SYU-15, California

We have reviewed the subject document and offer the following comments for your consideration.

General Comments

6-1

Environmental consequences identified for water resources on Intensive Timber Management Forest Lands may involve river segments included in the Phase I Nationwide Rivers Inventory.

The Bureau of Land Management is responsible for preparation of determination of adverse effect documents for proposed actions involving stream segments included in the Phase I Inventory in compliance with Council on Environmental Quality (CEQ) procedures. A copy of the CEQ procedures is enclosed.

Determinations of adverse effect should be prepared for individual harvesting plans to address environmental consequences of proposed actions on each Inventory river segment involved. Information provided in the subject programmatic environmental assessment does not identify the significance of environmental consequences to individual river segments. This Service is available to assist in the determination of significance of potential environmental consequences to Inventory rivers. We are also available to assist in the development of mitigation measures to minimize adverse environmental consequences.

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Measures to minimize adverse environmental consequences to significant cultural and recreational resources are also addressed below.

National Wild and Scenic Rivers System

The Scott River (Map 6-Redding District), Cottonwood Creek (Maps 21 and 23-Redding District), Big Chico Creek (Maps 26 and 27-Redding District) Pit River (Map 7-Susanville District) and Ash Creek (Maps 9 and 10-Susanville District) have been included in the Phase I Nationwide Rivers Inventory for the Pacific Southwest Region.

6-2

Any proposed action "which would effectively foreclose wild, scenic, or recreational river status on rivers on the Inventory", requires that Federal agencies consult with the Heritage Conservation and Recreation Service as part of their normal environmental review process (Presidential directive of August 2, 1979, in conjunction with his Environmental Message). Formal consultation procedures, prepared by the Council on Environmental Quality (CEQ), have now been finalized. This office can provide additional information to assist your agency in meeting its responsibilities under the President's directive. The final environmental assessment should include evidence of compliance with the National Wild and Scenic Rivers Act and Procedures 2 and 3 of the Council on Environmental Quality consultation procedures in regard to the predicted adverse environmental consequences identified in the draft assessment (increased sedimentation and reduced water quality, pages 4-7 and 4-8).

6-3

The mainstem of the Trinity River (Maps 16, 17, and 18-Redding District) is now being evaluated for possible designation as a component of the National Wild and Scenic Rivers System. In response to a petition from the Governor of California in accordance with Section 2(a)(ii) of the Wild and Scenic Rivers Act (Public Law 90-542 as amended), the Heritage Conservation and Recreation Service has been assigned responsibility by the Department to prepare an evaluation and environmental impact statement for the possible designation of the components of the California Wild and Scenic Rivers System to the National Wild and Scenic Rivers System. The Secretary of the Interior will determine whether the five river systems (Klamath, Trinity, Smith, Eel, and American), included in the State System, meet the criteria for designation to the National System.

The draft environmental statement, which addresses the potential impacts resulting from the proposed action, is now in the public review period (comment period ending November 20,1980).

⑥

6-3 The proposed Intensive Timber Management should be evaluated for possible foreclosure of potential designation of the Trinity River to the National Wild and Scenic Rivers System.

Cultural Resources

6-4 Eligibility of known and unrecorded cultural resources for nomination to the National Register of Historic Places, should be included in the final assessment. If formal determinations for known sites cannot be completed within a reasonable time period a prediction of the number of National Register eligible sites should suffice.

6-5 The final assessment should include evidence of consultation and coordination with the State Historic Preservation Officer (Dr. Knox Mellon, California Department of Parks and Recreation), and compliance with the National Historic Preservation Act (as amended), the Archeological and Historic Preservation Act of 1974 and Executive Order 11593.

Recreational Resources

6-6 The final assessment should identify the methodology employed to determine an adequate buffer zone width in Mitigation Measure Number 31 (page 2-28). A wider buffer zone, precluding timber harvest around recreational sites, may be appropriate in certain cases.

6-7 Applicable land use plans, particularly recreational plans of local, State, and Federal agencies should have been considered in the proposed action. In particular, the Statewide Comprehensive Outdoor Recreation Plan should be clearly demonstrated to have been a factor in the decision making process. Specific Plans of individual agencies such as county, or local agencies, likewise, must be considered.

Specific Comments

6-8 We believe that Map 19 (Susanville District) is incorrectly identified as Range 10 East and Range 11 East. The subject area is located in Range 12 East and Range 13 East.

Thank you for the opportunity to review the document.

Enclosure

RESPONSES

6-1 As indicated on page 1-1 this assessment serves as the foundation and framework for future environmental assessments of specific actions required for the timber management program. In the preparation of individual plans the Bureau is coordinating with Heritage Conservation and Recreation Service (HCRS) in the determination of significant and/or potential environmental consequences to rivers listed on the Nationwide inventory. BLM will also coordinate with HCRS when revising management plans which affect those rivers.

6-2 BLM will consult with HCRS when proposing any action which would effectively foreclose wild, scenic, or recreational river status on rivers on the inventory such as the Scott River, Cottonwood Creek, Big Chico Creek, Pit River and Ash Creek.

6-3 BLM will also coordinate with HCRS where the proposed action would affect the status of any river which is being evaluated for possible designation as a component of the National Wild and Scenic Rivers System such as the Klamath, Trinity, Smith, Eel, and American.

6-4 2 sites have been formally listed on the National Register of historic places and will be appropriately protected.

All known sites are recorded. It is predicted that sites are of National Register Quality and more formal protection measures will be taken if adverse impacts in the future appears likely.

6-5 In conducting the cultural resource sample the BLM archaeologists consulted and coordinated with the State Historic Preservation Officer (SHPO) in compliance with the National Historic Preservation Act (as amended), the Archaeological and Historic Preservation Act of 1974 and Executive Order 11593. This close coordination will continue in future assessments of individual projects as indicated in mitigation measures 33 through 35 on page 2-29 and 2-30. Correspondence with the SHPO on formal nominations is on file in the respective BLM District Offices.

RESPONSES (cont.)

6-6 The size of buffer zones for mitigation of noise and degradation of visual quality was determined primarily on the basis of visual concerns. Topography, character of vegetation, the intensity and duration of use by recreationists and timber managers were considered in determining the extent of the buffer. Each buffer zone is established on a case by case basis using the experience and judgement of the area managers and the inter-disciplinary team members.

6-7 The state-wide Comprehensive Outdoor Recreation Plan and specific plans of individual agencies were considered in identifying the available timber production base. In order to keep abreast of future changes, such plans will be reviewed again prior to implementation of individual actions through the site specific environmental assessment process.

6-8 Thank you for calling to our attention this error. Map 19 (Susanville District) is incorrectly identified as Range 10 and 11 East. This should be changed to Range 12 East and Range 13 East.

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UNITED STATES DEPARTMENT OF AGRICULTURE
FOREST SERVICE

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100 Forni Road
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District Manager
Bureau of Land Management
63 Natoma Street
Folsom, CA 95630

1950
[Your 1791 (C-040)]
October 29, 1980

DEPT. OF INTERIOR

Dear Sir or Madam:

These comments refer to the draft SYU-IS Timber Management E. A.

7-1 Third paragraph on page 2-9 states that the silvicultural systems available include selection, shelterwood, and seed-tree. Are all of these, and only these, systems to be applied? It appears that the intent is to use these three systems and to exclude the clearcutting system but the words "available" and "include" leave it open to conjecture.

7-2 Next to last paragraph on page 2-9 uses the term "selective cutting" apparently interchangeably with "selection system". Standard terminology developed by the Society of American Foresters equates selective cutting with high grading so this term obviously should not be used. Selection cutting would be an appropriate term.

7-3 See the last sentence of the same paragraph. Selection is a silvicultural system which has two methods of application: single-tree selection and group-selection. Thinning and sanitation-salvage can be a part of either method but these terms are generally applied under even-aged management systems and the term "selection cutting" is applied to all cutting under uneven-aged management.

The choice of management and silvicultural systems is critical but there is very little discussion of the reasons for the selection system being applied most predominantly (I believe that is what the E.A. says). Whether even-aged or uneven-aged management is selected affects both administrative and biologic elements. Experience has shown that uneven-aged management demands considerable professional involvement in the field and intensive data to attain desired structure and optimum productivity. Also most existing stands in California need drastic manipulation to approach the distribution of tree sizes needed for uneven-aged management.

Regeneration of desired species under uneven-aged management is difficult under some conditions, especially where single-tree selection is applied. On Dunning Site III and better, even-aged management utilizing clearcutting and other even-aged silvicultural systems has the advantages of both efficiency of administration and high productivity. It can also be utilized to create vegetative diversity desirable for wildlife. On the Eldorado National Forest

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7-3 our first concern is to get good stocking on all areas. Where stocking is poor and the residual is not thrifty, the only choice is to harvest the merchantable timber and establish an even-aged planatation. Short-term attainment of uneven-aged stocking objectives is not possible under these conditions.

I hope these comments are helpful, and please do not hesitate to call either Chris Carr, Forest Timber Management Officer, or Harry Hopkins, Forest Silviculturist, if you have any questions. They were both heavily involved in the development of the Forest's Timber Management Plan.

Sincerely,

ROBERT R. LUSK
Forest Supervisor

RESPONSES:

7-1 Page 2-3 has been revised to indicate the special situations where clear cutting may be used, i.e., after fire, insect and disease salvage and in site preparation on poorly stocked areas.

7-2 On page 2-9 we have changed the words "selective cutting" and "selection systems" to "selection cutting" to be consistent with the Society of American Foresters standard terminology.

7-3 Our description of silvicultural systems was included as a general background for the uninitiated reader and not as a silvicultural training guide. Our selection of silvicultural systems for any tract will depend upon the stand conditions and management objectives for that tract. A modified "unit area control" system is probably the best term for what we foresee. Based on our present knowledge of the stand conditions where appropriate we **expect** that much of the forest will be regenerated through two-stage shelterwood harvest similar to what is being successfully practiced by the Steamboat Springs and Tiller Ranger Districts of the Umpqua National Forest. Much of our timber management effort will be directed at overcoming the brush competition associated with the forest land at the lower elevations. The success of the system will depend upon the efforts and skills of our managers, foresters and other resource specialists. Our indication that a selection system would be used predominantly is partly based on the fact that much of our timber land is on sites near the lower limits of forest growth and obtaining regeneration is a problem because of heat and drought. Removing all the timber would change the micro-climate and compound the problem of obtaining regeneration. We do not expect to approach a regulated forest for about 200 years. We are planning an operations inventory to identify the areas of unsatisfactory stocking which are in need of treatment. This information will be used to set priorities for developing silvicultural prescriptions for specific areas. Our site specific Environmental Assessments of specific projects will address the special characteristics of each area.

Our foresters continue to receive silvicultural training and no doubt will be discussing the timber management challenges with Forest Timber Management Officers and Forest Silviculturists on not only the El Dorado but also other National Forests.

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GLOSSARY

ACQUIRED LANDS--Lands, or interest in lands, purchased by the United States managed as public lands.

ALFISOLS--Soils that have an accumulation of clays in the subsoil, are fairly high in exchangeable bases, and do not have thick dark surfaces.

ALLOWABLE CUT--The amount of timber that may be harvested annually or periodically from a specified area over a stated period of time in accordance with the objectives of management on a sustained-yield basis.

ARCHAEOLOGY--The scientific discipline responsible for recovering, analyzing, and interpreting the unwritten portion of Man's historic and prehistoric lifeway, thus contributing to our understanding of the present and to our ability to prepare for the future.

ARCHAEOLOGICAL RESOURCES--All evidences of past human occupations, other than historical documents, which can be used to reconstruct the lifeways of past peoples. These include sites, artifacts, environmental data, and all other relevant information.

ASPECT--The direction a slope faces.

AVERAGE EMPLOYMENT--The sum of number of employees, reported monthly, divided by 12. Because employment is reported for all employees working during any one month, it is a modest overestimate of full-time equivalent employment.

BIOME--A biotic community which covers an extensive geographic area with characteristic life forms and climax species of plants and animals.

BOARD FOOT (B.F.)--A unit of solid wood, one foot square and one inch thick.

BUCKING--Cutting trees into log lengths.

BUREAU PLANNING SYSTEM--A process used by the BLM to establish land use objectives, allocations, and constraints for various categories of public land.

CLASS I INVENTORY--Documentation of all known sources of cultural resource information.

CLASS II INVENTORY--A cultural resource inventory based upon the identification and evaluation of all cultural resources in a portion of an area which will permit an estimate of the nature and distribution of cultural resources of the entire area.

CLASS III INVENTORY--An intensive field inventory designed to identify and evaluate, from surface and exposed profile indications, all cultural resource sites within a specified area (usually a project area).

CLEARCUTTING--A method of timber havest in which all trees, merchantable or unmerchantable, are cut from an area.

CLEARING--The removal of trees, down timber, snags and brush within a road prism.

COMMERCIAL FOREST LAND--Forest land that is now producing or is capable of producing at least 20 cubic feet per acre per year of commercial coniferous tree species.

COMMERCIAL FOREST ZONE--Generally that area where commercial trees are found or expected. More precisely, it is the area covered by the extensive forest inventory.

COMMERCIAL THINNING--Removal of merchantable surplus trees.

COMMUNITY INCOME EFFECT--The sum of direct and indirect personal income generated by a change, i.e., timber harvest. Indirect personal income results from economic activity stimulated in other local enterprises by purchase of goods and services, primarily of a support nature.

CONTRAST RATING--A method of determining the extent of visual impact for an existing or proposed activity that will modify any landscape feature.

CULL--A tree or log which will not be harvested because it does not meet certain specifications.

CULTURAL RESOURCES--Remains of human activity, both historic and prehistoric. Structures, artifacts, works of art, historic documents and locations, architecture, and areas of religious or social importance to certain ethnic groups, such as the Native Americans or Chinese, are all considered cultural resources.

ECOSYSTEM--An ecological unit consisting of both living and nonliving components which interact to produce a natural, stable system.

ECOTONE--The transition zone between two adjacent biological communities.

ENTISOLS--Soils that have no strong differences between the surface horizon and the subsoil.

FALLING/FELLING--Cutting trees down.

FINAL HARVEST CUT--Removal of a mature stand, either through the final stage of a shelterwood regime or overstory removal.

FIRE-INDUCED COMMUNITY--A plant community which develops following fire. The community may be dominated by individuals which are resistant to fire or by young plants which have sprouted following fire.

FIRE-DEPENDENT ECOSYSTEM--An ecosystem kept at a permanent stage of disclimax for fire disturbance.

FORB--Any herb that is not a grass or grasslike.

FOREST DEVELOPMENT--A program of silvicultural treatment to perpetuate and improve production of wood and related values. It includes such treatments as site preparation, seeding, planting and protective measures.

FOREST LAND--Land that is now, or is capable of becoming, at least 10 percent stocked with forest trees and has not been developed for non-timber use.

FOREST MANAGEMENT PROGRAM--Includes timber activity plan and all forest resource related program activity plans.

GRADING--A road construction or maintenance operation performed by a road grader to ditch, shape, crown, trim and smooth the road to bring the subgrade to an acceptable level.

GROWING STOCK--The amount of standing green timber retained to produce forest products. Also known as forest capital.

GRUBBING--Removal of stumps, roots, and other wood material located in the road prism.

HABITAT--The environment in which an organism (plant or animal) occurs.

HIGH INTENSITY FOREST MANAGEMENT LANDS--All commercial forest land that is part of the timber production base for allowable cut calculation in the SYU-15.

INCEPTISOLS--A broad grouping of all soils that are not entisols and do not have strong enough differences between their surface and sub-surface layers to qualify as alfisols, mollisols, or ultisols.

INTERMEDIATE CUTTINGS--Any removal of merchantable trees from a stand which occurs prior to the final harvest cutting, i.e., commercial thinning, sanitation/salvage, or shelterwood regeneration cuttings.

INTENSIVE TIMBER MANAGEMENT--The practice of converting an unregulated forest into a maintained and managed forest to approach the desired and optimum level of growing stock as rapidly as possible by such practices as precommericial and commercial thinning, large-scale site preparation, planting, brush and hardwood control, fertilization and forest genetic improvements.

LABOR FORCE/POPULATION RATIO--The labor force of a county, divided by county population. The ratio is used in inferring average resident population dependent upon each job.

LANDING--Any place on or adjacent to the logging site where logs are assembled for further transport.

LANDSCAPE CHARACTER--The arrangement of a particular landscape as formed by the variety and intensity of the basic elements of form, line, color and texture.

MANAGEMENT FRAMEWORK PLAN (MFP)--Land-use plan for public lands administered by the BLM which provides a set of goals, objectives and constraints for specific planning area to guide the development of detailed plans for the managment of each resource.

METAMORPHIC ROCKS--Rocks changed in form or character by extreme heat and pressure.

MOLLISOLS--Soils that have dark surface horizons, are high in organic matter, and have at least 50 percent base saturation.

MULTIPLE USE--Management of the public lands and their various resource values so that they are utilized in the combination that will best meet the present and future needs of the American people; making the most judicious use of the land for some or all of these resources or related services over areas large enough to provide sufficient latitude for periodic adjustments in use to conform to changing needs and conditions; the use of some land for less than all of the resources; a combination of balanced and diverse resource uses that takes into account the long-term needs of future generations for renewable and nonrenewable resources, including, but not limited to, recreation, range, timber, minerals, watershed, wildlife and fish, and natural, scenic, scientific and historical values; and harmonious and coordinated management of the various resources without permanent impairment of the productivity of the land and the quality of the environment with consideration being given to the relative values of the resources and not necessarily to the combination of uses that will give the greatest economic return or the greatest unit output.

NATIONAL REGISTER OF HISTORIC PLACES (NATIONAL REGISTER)--Established by the Historic Preservation Act of 1966, the Register is a listing maintained by the National Park Service of architectural, historical, archaeological, and cultural sites of local, State or national significance. Sites are nominated to the Register by the States and by Federal agencies.

NON-COMMERCIAL FOREST LAND--Land which is not capable of yielding at least 20 cubic feet of wood per acre per year of commercial species or land which is capable of producing only non-commericial tree species.

NON-FOREST LAND--Land that has been developed for non-timber uses or land that is incapable of being 10 percent stocked with trees.

OPERATION INVENTORY--An intensive forest inventory which provides forest managers with information on the location, acreage, and silvicultural needs of commercial forest lands.

PALEONTOLOGY--A science dealing with the life forms of past geological ages as known from fossil remains.

PARTIAL CUTTING--Removal of trees by any method other than clearcutting.

PLANNING AREA ANALYSIS (PAA)--A planning document which analyzes the relationship of social and economic data to the physical and biological data presented in a Unit Resource Analysis (URA).

PLANT COMMUNITY--An association of plants of various species found growing together in different areas with similar site characteristics.

PRECOMMERCIAL THINNING--Removal of surplus trees in a stand before they reach merchantable size.

PUBLIC LANDS--Any land and interest in land owned by the United States within the several States and administered by the Secretary of the Interior through the Bureau of Land Management. May include public domain, O&C, or acquired lands in any combination.

PUBLIC DOMAIN LANDS--Original holdings of the United States never granted or conveyed to other jurisdictions.

REFORESTATION--Reestablishment of a tree crop on forest land.

REGENERATION--The renewal of a tree crop, by natural or artificial means. Also, the young crop itself.

REGENERATION CUT--One of the phases of shelterwood cutting designed to open the canopy of a stand sufficiently to allow the establishment of regeneration, i.e., either the first stage of a two-stage shelterwood cutting or the second stage of a three-stage shelterwood cutting.

REGENERATION PERIOD--The time it takes for a new coniferous timber stand to become established following the final harvest cut.

RIPARIAN--Pertaining to natural communities which develop on or near the banks of a body of water.

ROAD MAINTENANCE--Work done on a road to maintain it in an acceptable condition for vehicular travel.

ROAD PRISM-- The area within the cut and fill of a road.

SANITATION/SALVAGE CUTTING--Removal of individual trees killed or injured by fire, insects, disease, etc., and the removal of those trees likely to die prior to final harvest cut in order to use merchantable material.

SAVANNAH--A grassy expanse with scattered trees.

SAWLOG--A log considered suitable in size and quality for producing sawn timber.

SCARIFICATION--Disturbance of the upper soil layer by mechanical means in preparing a site for seeding for planting.

SCENIC QUALITY--The quality of the scenery as determined through the use of the scenic evaluation process.

SCRIBNER LOG RULE--A log rule constructed from diagrams which shows the number of 1-inch boards which can be drawn in a circle representing the small end of a log. The Scribner Rule assumes a ¼-inch saw cut, makes a liberal allowance for slabs and disregards taper.

SENSITIVITY LEVEL(S)--An index of the relative importance or volume of visual response to an area in relation to other areas in the planning unit.

SHELTERWOOD CUTTING--A series of partial cuttings designed to establish a new crop of trees under the protection of the old.

SILVICULTURE--The art of producing and tending a forest.

SITE CLASS--A measure of the relative productive capacity of an area for timber or other vegetation.

SLASH--The branches, bark, tops, cull logs, and broken or uprooted trees left on the ground after logging has been completed.

SNAG--A standing dead tree from which the leaves and most of the branches have fallen.

SOIL--The unconsolidated mineral and organic material on the immediate surface of the earth that serves as a natural medium for the growth of land plants.

STATE HISTORIC PRESERVATION OFFICE (SHPO)--The official within each State, authorized by the State at the request of the Secretary of the Interior to act as liaison for implementing the National Historic Preservation Act of 1966.

STRUCTURES--In connection with road construction, bridges, fords, culverts, cattleguards, gates, fences, riprap, etc.

SUCCESSION (ECOLOGICAL)--The orderly process of biologic community change. The process by which one biologic community succeeds another over time, given the same climatic conditions.

SURFACING--The application of a wearing surface such as rock aggregates, or bituminous material, to a road.

SUSTAINED YIELD--The achievement and maintenance in perpetuity of a high-level annual or regular periodic output of the various renewable resources of the public lands consistent with multiple use. This term is most commonly associated with forest management and the provisions of an undiminished or "even flow" average annual production of wood fiber over decades. It is also applicable to the management of all renewable resources including forage, wildlife, water, recreation or any value that can be managed for renewal and sustained productivity. It is dependent on the application of multiple use management in a way that assumes the maintenance of the land's productivity.

SUSTAINED YIELD UNIT (SYU)--A geographic area for which an allowable timber cut is determined, providing for continuous, undiminishing flow of timber at a given intensity of management.

TEXTURE (SOIL)--The relative proportion of sand, silt, and clay (expressed as percentages) in a soil expressed in terms of standard classes and subclasses in the USDA Soil Survey Manual.

TIMBER MANAGEMENT PLAN--A plan which deals specifically with the implementation of the approved allowable cut.

TIMBER PRODUCTION BASE--Acres included in the calculation of the allowable cut (see high intensity forest management lands).

TIMBER PRODUCTION CAPABILITY CLASSIFICATION (TPCC)--A classification system that identifies the commerical forest land base capable of producing timber on a sustained-yield basis.

TRUE FIR--A member of the genus Abies, for example white fir (Abies concolor); Douglas-fir (Pseudotsuga menziesii) is not a true fir.

ULTISOLS--Soils that are similar to alfisols in that they have an accumulation of clays in the subsoil, but are more highly leached and therefore have very low base saturations and cation exchange capacity.

UNDERSTORY SPECIES--Shade-tolerant plant species which characteristically grow beneath the forest canopy. Examples include blackberry and rhododendron.

UNIT AREA CONTROL--A silvicultural concept in which the essential characteristic is detailed control of stocking on small areas.

UNIT RESOURCE ANALYSIS (URA)--A BLM planning document which contains a comprehensive inventory of the physical resources, and an analysis of their potential for development, within a specified geographic area.

VISUAL CONTRAST--The effect of a striking difference in the form, line, color, or texture of an area being viewed.

VISUAL RESOURCE--The land, water, vegetation, animals, and other visible features that characterize any given landscape.

VISUAL RESOURCE MANAGEMENT (VRM)--Consideration of the visual aspects of the landscape during development of managment objectives for all resources and during the planning, design and implementation of measures to meet those objectives.

VISUAL RESOURCE MANAGMENT CLASSES--Classification of the degree of alteration that is acceptable within the characteristic landscape. It is based upon the physical and sociological characteristics of any given homogeneous area.

VISUAL ZONES--The areas that can be seen from a given location, classified as foreground, middleground, background or seldom seen.

WATER QUALITY--The biological and chemical content of water in relation to the use to which the water will be put.

WATERSHED--The area drained by a given stream.

YARDING--Transport of timber from the stump to landing.

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______________. 1978c. "Socio-Economic Profile, Redding District"

______________. 1979a. *Draft Environmental Statement, Jackson and Klamath Sustained Yield Units, Ten-Year Timber Management Plan.* Portland: U. S. Dept. Int., Bur. Land Management.

______________. 1979b. "Timber Production Capability Classification. "BLM Manual, Chapter 5250, California State Office Supplemental.

APPENDIX A

IN REPLY REFER TO:
C-041
1792
5240

United States Department of the Interior

BUREAU OF LAND MANAGEMENT

STATE OFFICE
Federal Office Building
2800 Cottage Way
Sacramento, California 95825

August 17, 1979

INTENT TO PREPARE AN ENVIRONMENTAL ASSESSMENT AND SCOPING PROCESS

Dear Reader:

The Department of the Interior, Bureau of Land Management, will prepare an Environmental Assessment (EA) on its timber management program for Sustained Yield Unit 15 (SYU-15). The SYU will involve public lands within the Bakersfield, Folsom, Redding, Carson City, and Susanville Districts (see attached map).

82,279 Acres to be Managed for Timber

An extensive inventory was conducted on these five districts involving approximately 837,000 forest acres. 141,511 acres have been identified as productive, commercial forest land (20 cu. ft./acre per year) with 91,319 acres capable of producing timber on a sustained yield basis. The environmental assessment will evaluate timber management alternatives for a forest land base of 82,279 acres after providing for stream side buffers, critical watershed, visual resources, recreation sites, natural areas, wildlife, plant protection, and other uses of the public lands.

Purpose of the Assessment

The purpose of the proposed action is to provide for a level of timber production commensurate with even flow sustained yield. The assessment will:

-Describe timber management practives on SYU-15 (e.g., harvest cuttings, thinning, yarding methods, reforestation, site improvement, and road construction and maintenance) needed to sustain the harvest level; evaluate their individual, combined, and cumulative environmental impacts; and discuss measures for mitigating impacts.

-Provide the foundation for environmental analyses of specific proposed projects in each district, including identifying any factors requiring close attention in such analysis and any areas requiring further study.

CONSERVE AMERICA'S ENERGY

Save Energy and You Serve America!

-Provide the public and the Bureau information needed to evaluate alternative proposed actions during the course of land use planning and timber management development.

Alternative Timber Management Plans

Three alternative timber management plans are being considered for the forestry program in the decade 1975-1984. Each will be evaluated as part of the assessment.

1. No Timber Management Program. This alternative would require the cessation of all activities currently carried out for the purpose of growing and harvesting timber. Although no planned timber harvest would be carried out, some protection practices associated with timber management, such as fire suppression and forest pest control would continue to protect and/or enhance non-timber values and uses.

2. Limited Investment in Timber Production. This alternative would include timber production without implementation of intensive management practices. The forest base acreage would be modified to account for other resource values and available timber lands would generate yields largely under natural conditions without the application of intensive forest management practices. An Annual Allowable Cut (AAC) of approximately 10.2 MMBM would be harvested under this alternative from a commercial base of 91,319 acres.

3. Intensive Timber Management. This alternative includes timber production with intensive timber management practices and multiple use constraints. Approximately 11.7 MMBM would be removed each year from a commercial base of 91,319 acres utilizing selection, shelterwood, and seed-tree silvicultural systems. The forest land base would be modified to account for other resource values and available timber lands would be treated with currently feasible intensive management practices (e.g., pre-commercial and commercial thinning; site preparation including hand mechanical clearing with scarification, prescribed burning, planting, and to a limited extent, selective use of chemical spraying and fertilizer) to increase the production of timber. This alternative would allow full management of existing forest land under the principles of sustained yield.

4. Other Alternatives. Other alternatives may be developed during the scoping process and analyzed in this assessment. The no action alternative shall be included.

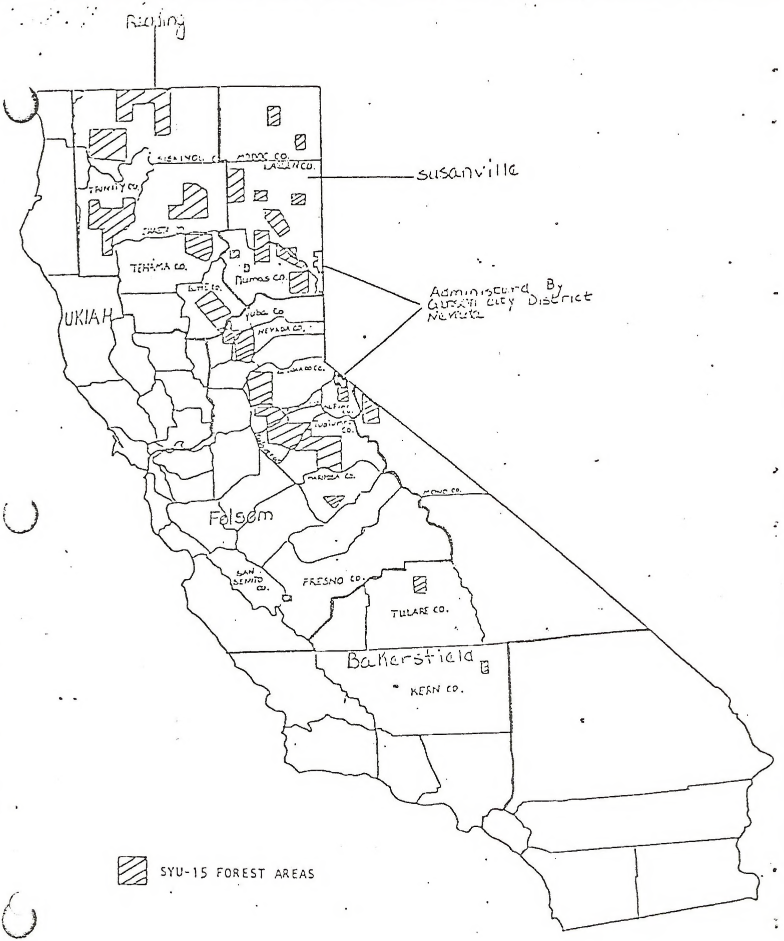
Scoping Process

Your interest and active participation is encouraged during the assessment process. In order to comply with the intent of the new Federal Council on Environmental Quality (CEQ) regulations, the Bureau will be limiting the number of topics and alternatives analyzed to only those which are major in significance. BLM wants your help in making a determination of the issues and additional alternatives (if any) which should be covered in detail. We have compiled a preliminary list of key issues which we feel should be addressed in the Timber Management Plan. These issues were identified during earlier planning efforts. The enclosed list is not intended to be a final or complete list of issues. New issues may be suggested during this initial public involvement phase or the issues identified (Enclosure 2) may be refined, changed, or added to. After your review of the action and alternatives, please list those issues which you deem important on Enclosure 3 in order of greatest importance. Your response will help us determine where the major emphasis should be placed in the document. Please take the time to review and comment on this material by September 7, 1979 and forward to the Folsom District Office.

The draft environmental assessment with BLM's preferred course of action will be distributed for further review and comment this fall. A list showing the location where the EA is available for review will be mailed to interested parties.

To discuss the proposal and alternatives in more detail, call Roy Pearl at (916) 985-4474, Bureau of Land Management, Folsom District Office, 63 Natoma Street, Folsom, California 95630.

Enclosures
  1 - SYU-15 Map
  2 - Preliminary Issue Statement
  3 - Issue Identification Worksheet


Redding
SISKIYOU CO.
MODOC CO.
LASSEN CO.
Susanville
TRINITY CO.
SHASTA CO.
TEHAMA CO.
Plumas CO.
BUTTE CO.
Administerd By Carson City District Nevada
UKIAH
YUBA CO
NEVADA CO.
EL DORADO CO.
ALPINE CO.
TUOLUMNE CO.
MARIPOSA CO.
MONO CO.
Folsom
SAN BENITO CO.
FRESNO CO.
TULARE CO.
Bakersfield
KERN CO.
SYU-15 FOREST AREAS

Enclosure 1

PRELIMINARY ISSUE STATEMENT

1. ISSUE - Concern over the effects of timber management activities on fish and wildlife habitat.

   INDICATORS OF THE ISSUE:

   - reduction of critical deer winter range as a result of harvesting hardwood (oak)/pine stands thereby limiting available food supplies.
   - adverse impacts of road construction on water quality and the fishery resource.
   - possible impacts on endangered species.
   - raptor nesting and roosting sites for Bald and Golden Eagles.
   - habitat requirements for the Spotted Owl.

2. ISSUE - Concern over the affect of timber management activities on the quality of the environment and visual resources.

   INDICATORS OF THE ISSUE:

   - private landowners want timbered areas adjacent to summer tract developments excluded from logging.
   - use of herbicide spraying.
   - protection and preservation of remnant old-growth Douglas-fir stands for recreation.
   - Native American concerns over the possible destruction of cultural sites.

3. ISSUE - Intensity of timber management practices and activities.

   INDICATORS OF THE ISSUE:

   - declining productive forest land base with increased demand for wood products.
   - rising cost of lumber products.

Enclosure 2

4. ISSUE - Social and economic costs and benefits derived or foregone with implementation of the timber management program.

INDICATORS OF THE ISSUE:

- program costs of implementation.
- employment opportunities.

STATE OF CALIFORNIA—RESOURCES AGENCY

EDMUND G. BROWN JR., Governor

DEPARTMENT OF FORESTRY
NINTH STREET
AMENTO, CALIFORNIA 95814
16) 322-4898

DEPT. OF INTERIOR
BUR. OF LAND MGT.
FOLSOM DIST. OFFICE
SEP 12 1979
AM 7,8,9,10,11,12,1,2,3,4,5,6 PM

SEP 11 1979

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	DM OPNS		
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	AM III		
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Mr. Jim Rusch
State Director
Bureau of Land Management
2800 Cottage Way
Sacramento, California 95825

Attention: Roy Pearl
Folsom District Office

Dear Jim:

Subject: Comments on Issue Identification
Timber Management SYU-15 (Folsom District)
(Your C-041 1972 5240)

The Department of Forestry feels all of the issues that have been identified are important. Wherever the major emphasis is placed, the other issues should not be ignored. Depending on where the emphasis is placed in the final document, there may be some changes in the priority of the other issues. Coordination of final plans with California's Forest Resources Assessment Program is essential, especially in the definition of eligible lands and timber types.

Issue 4 (Socio-economic effects of BLM timber management) should address the effects of BLM timber management on private lands and timber management. Problems include access, production and management of intermingled lands, and compatibility of treatments.

We suggest you add Issue 5, as follows:

The problem of fire protection vis a vis BLM's contract with CDF:

- Fuel and hazard reduction.
- Timber management effects on fire protection (e.g., access, including access for ORV's; creation of slash; use of prescribed fire).

- The need for better fire protection to protect timber management investments, including contractual arrangements for protection and costs.
- BLM's plans for fire protection on lands designated for management, and by non-designation, any potential problems such as "modified protection" or "fire management" that must be accomplished in cooperation with CDF.

Sincerely,

Original Signed by

DAVID E. PESONEN
Director

cs

ISSUE IDENTIFICATION

#3

BLM -- PLEASE PUT THE FOLLOWING NAME ON THE MAILING LIST FOR SUSTAINED YIELD UNIT 15 INFORMATION --

name William E. Coulter

#4

representing Shasta County Assessor

street Rm 115 Court House

city Redding state CA. zip 96001

#2

* I am especially interested in timber management in --

☐ Bakersfield District
☐ Folsom District
☒ Redding District
☒ Susanville District

☐ all of SYU-15

☐ other area, specify

#1

DEPT. OF INTERIOR
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FOLSOM DIST. OFFICE
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Enclosure 3

ISSUE IDENTIFICATION

ISSUE NO. 3 "Intensity of Timber Management Practices" is of first importance. Unless we recognize that our resource base must be protected, our way of life will disappear.

ISSUE NO. 4 This is really a combination of Issues 1 and 2, plus some other considerations. It is a corollary of Issue 3 and is of similar importance.

BLM -- PLEASE PUT THE FOLLOWING NAME ON THE MAILING LIST FOR SUSTAINED YIELD UNIT 15 INFORMATION --

name Eldred S Bliss

representing Fresno County Natural Resources Coordinator

street 4499 E. Kings Canyon Rd

city Fresno state Calif. zip 93702

* I am especially interested in timber management in --

__ Bakersfield District

__ Folsom District

__ Redding District

__ Susanville District

[✓ all of SYU-15]

__ other area, specify

Enclosure 3

DIAMOND INTERNATIONAL CORPORATION

CALIFORNIA LUMBER DIVISION
P. O. BOX D
RED BLUFF, CALIFORNIA 96080
916-527-2231

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BUR. OF LAND MGT.
FOLSOM DIST. OFFICE
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Necessary Action			
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September 21, 1979

United States Department of the Interior
Bureau of Land Management
2800 Cottage Way
Sacramento, CA 95825

Gentlemen:

Your invitation to comment on the "alternate Timber Management Plans" during the assessment process has been received. I heartily endorse Plan #3 Intensive Timber Management.

One very puzzeling thing strikes me and I would appreciate your written response. You state that this land is capable of producing timber on a sustained yield basis. Then state that "this is a forest land base --- and will provide for stream side buffers, critical watershed, visual resources, recreation sites, natural areas, wildlife, plant protection and other uses of the public lands". If you are evaluating all of these worthwhile things and still have a "manageable commercial forest" with a determinable allowable sustained cut, then what is the question? With your professional staff of graduate land managers with their experience and expertise, what is to be accomplished by having a vote count from the unprofessional public? Renewable resources are too few to not be managed in a professional manner.

Sincerely,

Rob't H. Barrett

Rob't. H. Barrett

ph

c: M. J. Huetter
   Roy Pearl

DEPT. OF INTERIOR
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FOLSOM DIST. OFFICE
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ISSUE IDENTIFICATION		
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ROD ASH
CONSERVATION CHAIRMAN
WINTU CHAPTER
NAT. AUDUBON SOCIETY
RT 1, BOX 28, COTTONWOOD
CALIF 96022

The Wintu Chapter - National Audubon Society feels that issue # 1 effects of timber management on fish and wildlife habitat is the most important issue. We trust that, in light of diminishing habitat in the booming northern counties, the BLM will give very careful consideration to protection of habitat.

Issue # 2 - quality of environment is the second in importance to us.

Sincerely
Rod Ash
Conservation Chairman

I COMMEND YOUR THOUGHTS ON
ISSUES 1 - 2 - 3
Suggest

ISSUE IDENTIFICATION

(1A) Concern over the effects
of Timber management and
Fire Control

Make plans now for improved
lower growth management so new trees have good
start & then not threatened by excess
Fuel in lower stories (Ground Cover control)

As in most Gov, management, ~~as this~~ some additional
lands will be needed — roads — buffer zones —
Past Gov acquisition has been shoddy - improve

Concern ~~for~~ energy needs & ~~met~~ suggest
inclusion by ~~Gov~~ Bureau & industry of ~~today~~ research
into better use of waste (slash in
Field & Dust & scrap in Mills.

Have loggers make
their own Alcohol!

~~Management should~~ ↑
New forestry
industry

Enclosure 3

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ISSUE IDENTIFICATION

1. ECONOMICS -

OF THE THREE TIMBER MANAGEMENT PLANS PRESENTED WE SUPPORT ALTERNATIVE # 3 INTENSIVE TIMBER MANAGEMENT.

J.H. Dillard
J.H. DILLARD
SIERRA PACIFIC IND.
SUSANVILLE, CALIF.

DEPT. OF INT
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BLM -- PLEASE PUT THE FOLLOWING NAME ON THE MAILING LIST FOR SUSTAINED YIELD UNIT 15 INFORMATION --

name J. H. DILLARD
representing SIERRA PACIFIC IND.
street P.O. BOX 820
city SUSANVILLE state CAL zip 96130

* I am especially interested in timber management in --

- __ Bakersfield District
- __ Folsom District
- __ Redding District
- → [✓ Susanville District]
- __ all of SYU-15
- __ other area, specify ______

APPENDIX B

AUTHORIZING LEGISLATION

The following list includes major legislation and Executive Orders which direct the policy and guidelines of the Bureau of Land Management. This list is not intended to be comprehensive.

Antiquities Act (16 U.S.C. 431, 432, 433)
Bald and Golden Eagles Protection Act (16 U.S.C. 668-668d)
Clean Air Act (42 U.S.C. 1857)
Endangered Species Act of 1973 (16 U.S.C. 1531-1543)
Executive Order 11593 (16 U.S.C. 470)
Federal Environmental Pesticide Control Act of 1972 (7 USC 136-136y)
Federal Land Policy and Management Act of 1976 (43 U.S.C. 1700)
Federal Water Pollution Control Act (33 U.S.C. 1251-1376)
Fish and Wildlife Coordination Act (16 U.S.C. 661-666c)
Historic Sites, Buildings and Antiquities Act (16 U.S.C. 461-467)
Materials Sales Act of 1947, as amended (30 U.S.C. 601 et. seq.)
National Historic Preservation Act of 1966 (16 U.S.C. 470-470b,470c-470n)
Noise Control Act of 1972 (42 U.S.C. 4901-4918)
Recreation and Public Purposes Act (43 U.S.C. 869, 869-4)
Safe Drinking Water Act (42 U.S.C. 300f-300;-9)
Solid Waste Disposal Act (42 USC 3251-3259)
Taylor Grazing Act of 1934, as amended (43 U.S.C. 315)
Wild and Scenic Rivers Act (16 U.S.C. 1271-1287)
Sikes Act, as amended (16 U.S.C., 670 et. seq.)
Executive Order 11988 (42 FR 26951; May 25, 1977)
Executive Order 11990 (42 FR 26961: May 24, 1977)

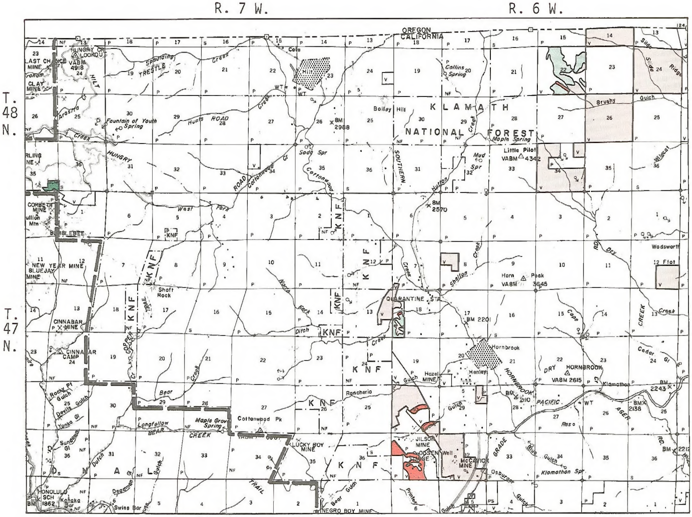
APPENDIX C
COMMERCIAL AND NON-COMMERICAL FOREST LANDS IN SYU-15

The following maps show the entire forest land base of SYU-15. The commerical forest land in the available timber production base is depicted in green. The non-commercial forest land and commerical forest lands withdrawn from intensive timber management are shown in red.

These maps are based on more detailed maps in the District Offices. The District Office maps are accompanied by field observation narratives and worksheets for each survey unit shown and by a tabulation of acres in each category as identified by the TPCC and MFP processes.

UNITED STATES DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
CALIFORNIA DISTRICTS OF
BAKERSFIELD, SUSANVILLE, REDDING & FOLSOM

SUSTAINED YIELD UNIT 15



LEGEND

BLM COMMERCIAL FOREST LAND

AVAILABLE TIMBER PRODUCTION BASE
- 🟩 Intensive Timber Management Forest Land
- 🟩 Restricted Forest Land

🟥 Withdrawn Forest Land

⬜ BLM NON-COMMERCIAL FOREST LAND

SCALE: ½" = 1 Mile
Mt. Diablo Base and Meridian

REDDING DISTRICT
Map 1 of 29 maps

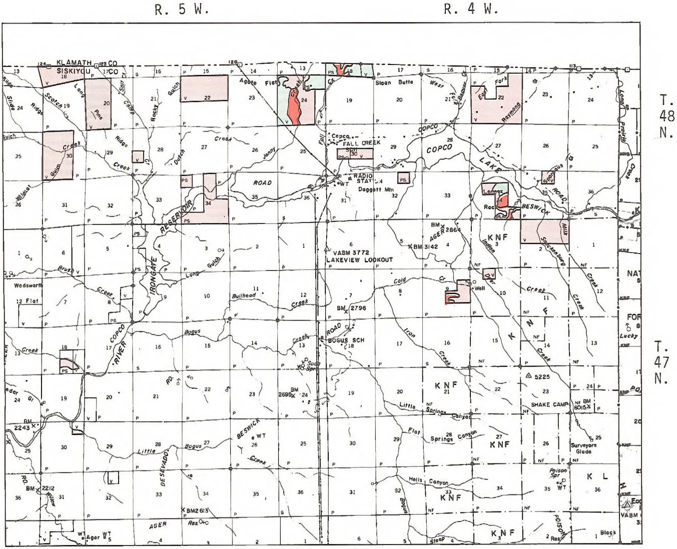
UNITED STATES DEPARTMENT OF THE INTERIOR

BUREAU OF LAND MANAGEMENT

CALIFORNIA DISTRICTS OF

BAKERSFIELD, SUSANVILLE, REDDING & FOLSOM

SUSTAINED YIELD UNIT 15



LEGEND

BLM COMMERCIAL FOREST LAND

AVAILABLE TIMBER PRODUCTION BASE
NONE Intensive Timber Management Forest Land
🟩 Restricted Forest Land

🟥 Withdrawn Forest Land

▨ BLM NON-COMMERCIAL FOREST LAND

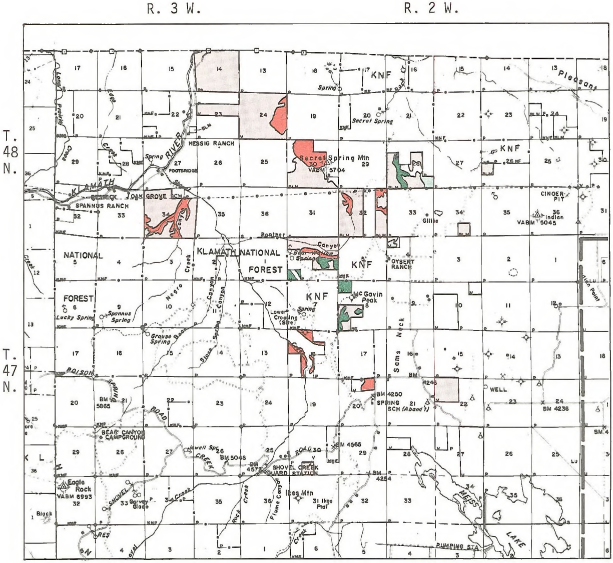
SCALE: ½" = 1 Mile

Mt. Diablo Base and Meridian

REDDING DISTRICT
Map 2 of 29 maps

UNITED STATES DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
CALIFORNIA DISTRICTS OF
BAKERSFIELD, SUSANVILLE, REDDING & FOLSOM

SUSTAINED YIELD UNIT 15



LEGEND

BLM COMMERCIAL FOREST LAND

AVAILABLE TIMBER PRODUCTION BASE
- 🟩 Intensive Timber Management Forest Land
- ▨ Restricted Forest Land

🟥 Withdrawn Forest Land

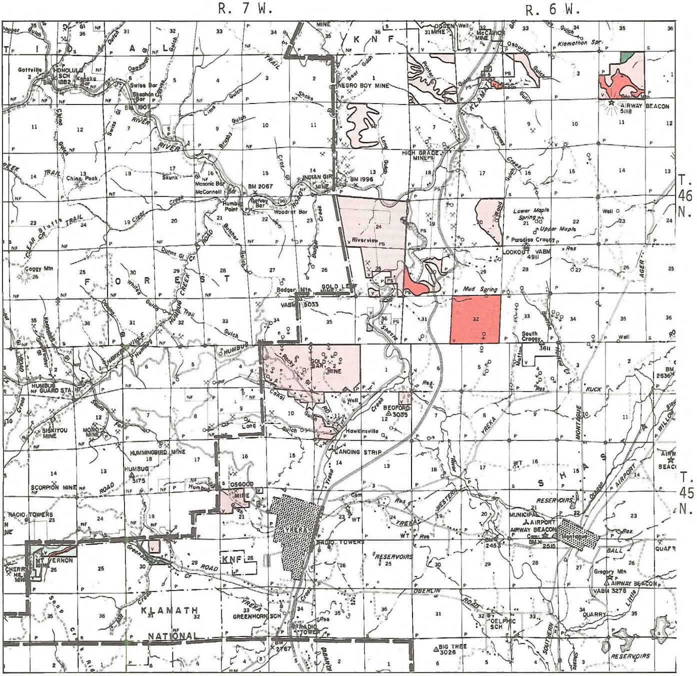
⬜ BLM NON-COMMERCIAL FOREST LAND

SCALE: ½" = 1 Mile
Mt. Diablo Base and Meridian

REDDING DISTRICT
Map 3 of 29 maps

UNITED STATES DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
CALIFORNIA DISTRICTS OF
BAKERSFIELD, SUSANVILLE, REDDING & FOLSOM

SUSTAINED YIELD UNIT 15



LEGEND

BLM COMMERCIAL FOREST LAND

AVAILABLE TIMBER PRODUCTION BASE
- 🟩 Intensive Timber Management Forest Land
- 🟩 Restricted Forest Land

🟥 Withdrawn Forest Land

▢ BLM NON-COMMERCIAL FOREST LAND

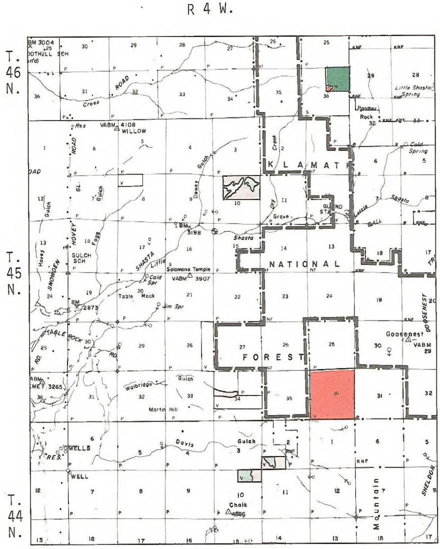
N

SCALE: ½" = 1 Mile
Mt. Diablo Base and Meridian

REDDING DISTRICT
Map 4 of 29 maps

UNITED STATES DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
CALIFORNIA DISTRICTS OF
BAKERSFIELD, SUSANVILLE, REDDING & FOLSOM

SUSTAINED YIELD UNIT 15



LEGEND

BLM COMMERCIAL FOREST LAND

AVAILABLE TIMBER PRODUCTION BASE
- 🟩 Intensive Timber Management Forest Land
- ▨ Restricted Forest Land

🟥 Withdrawn Forest Land

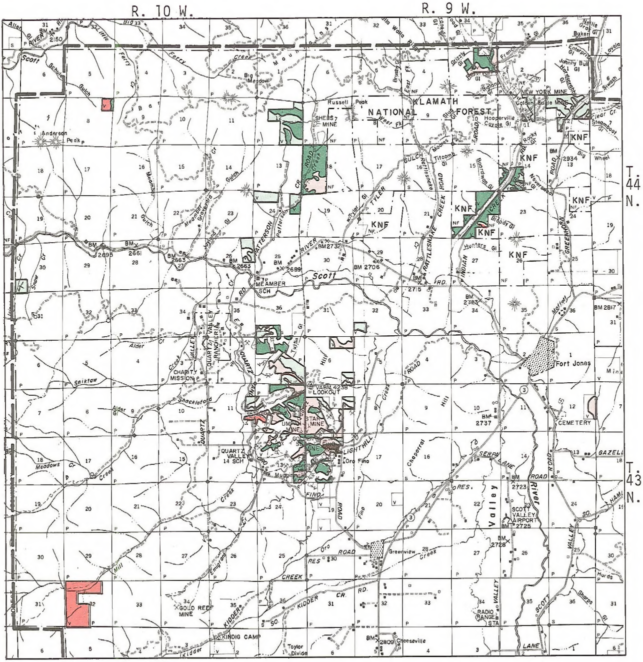
▭ BLM NON-COMMERCIAL FOREST LAND

SCALE: ½" = 1 Mile
Mt. Diablo Base and Meridian

REDDING DISTRICT
Map 5 of 29 maps

UNITED STATES DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
CALIFORNIA DISTRICTS OF
BAKERSFIELD, SUSANVILLE, REDDING & FOLSOM

SUSTAINED YIELD UNIT 15



LEGEND

BLM COMMERCIAL FOREST LAND

AVAILABLE TIMBER PRODUCTION BASE
🟩 Intensive Timber Management Forest Land
▨ Restricted Forest Land

🟥 Withdrawn Forest Land

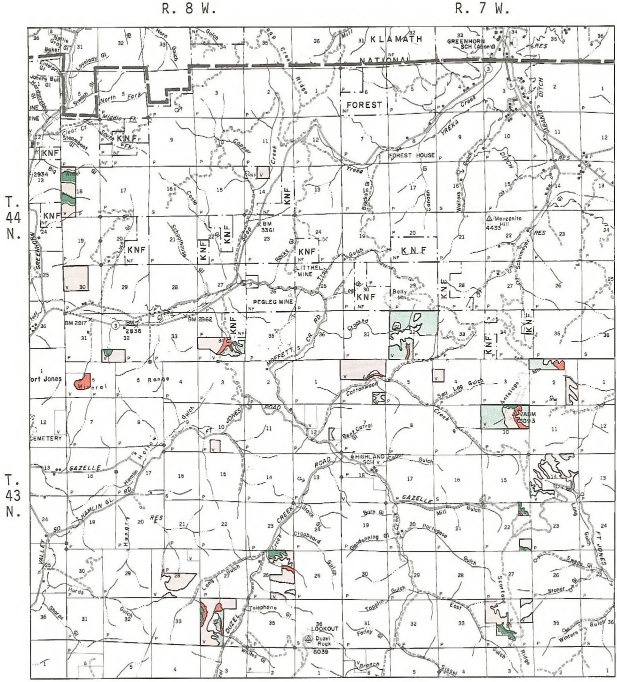
▢ BLM NON-COMMERCIAL FOREST LAND

SCALE: ½" = 1 Mile
Mt. Diablo Base and Meridian

REDDING DISTRICT
Map 6 of 29 maps

UNITED STATES DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
CALIFORNIA DISTRICTS OF
BAKERSFIELD, SUSANVILLE, REDDING & FOLSOM

SUSTAINED YIELD UNIT 15



LEGEND

BLM COMMERCIAL FOREST LAND

AVAILABLE TIMBER PRODUCTION BASE
- 🟩 Intensive Timber Management Forest Land
- ▨ Restricted Forest Land

🟥 Withdrawn Forest Land

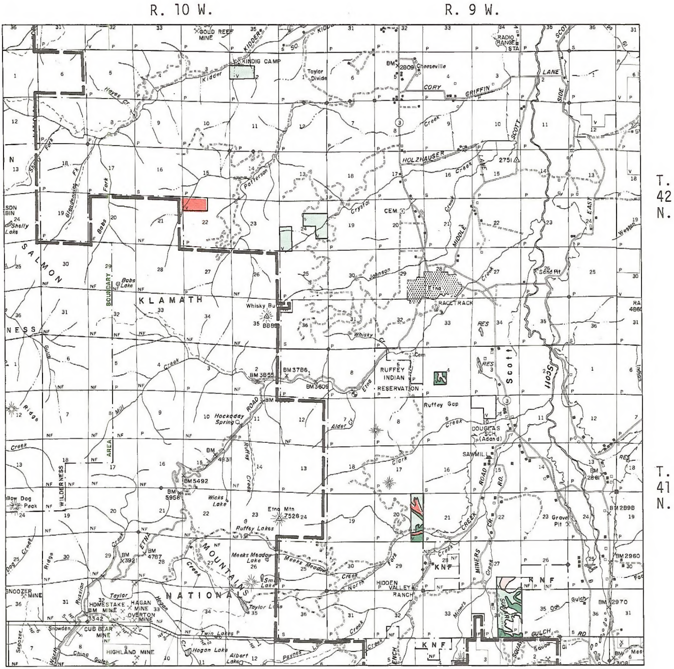
☐ BLM NON-COMMERCIAL FOREST LAND

SCALE: ½" = 1 Mile
Mt. Diablo Base and Meridian

REDDING DISTRICT
Map 7 of 29 maps

UNITED STATES DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
CALIFORNIA DISTRICTS OF
BAKERSFIELD, SUSANVILLE, REDDING & FOLSOM

SUSTAINED YIELD UNIT 15



LEGEND

BLM COMMERCIAL FOREST LAND

AVAILABLE TIMBER PRODUCTION BASE
- 🟩 Intensive Timber Management Forest Land
- ▨ Restricted Forest Land

🟥 Withdrawn Forest Land

▨ BLM NON-COMMERCIAL FOREST LAND

SCALE: ½" = 1 Mile
Mt. Diablo Base and Meridian

REDDING DISTRICT
Map 8 of 29 maps

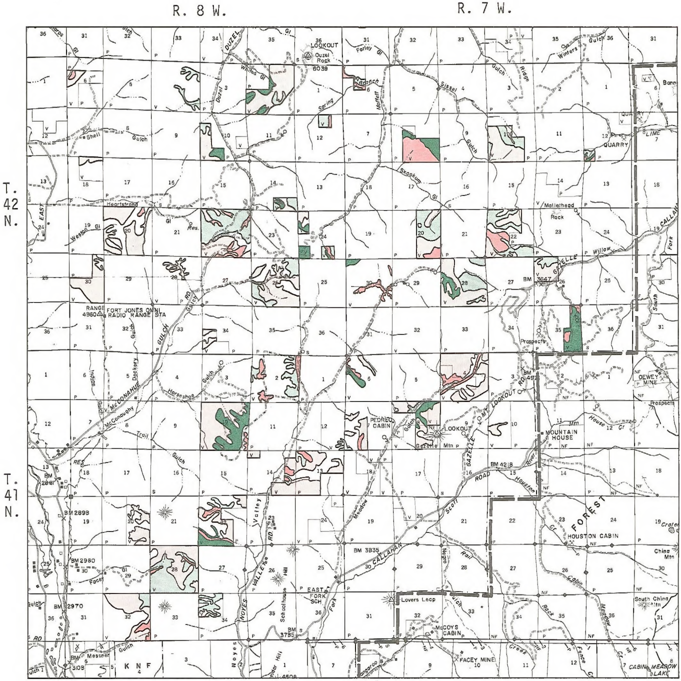
UNITED STATES DEPARTMENT OF THE INTERIOR

BUREAU OF LAND MANAGEMENT

CALIFORNIA DISTRICTS OF

BAKERSFIELD, SUSANVILLE, REDDING & FOLSOM

SUSTAINED YIELD UNIT 15



LEGEND

BLM COMMERCIAL FOREST LAND

AVAILABLE TIMBER PRODUCTION BASE
- 🟩 Intensive Timber Management Forest Land
- ▨ Restricted Forest Land

🟥 Withdrawn Forest Land

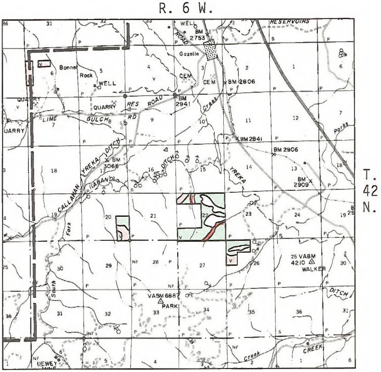
☐ BLM NON-COMMERCIAL FOREST LAND

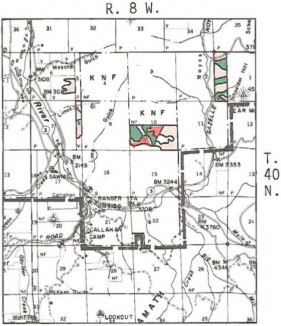
REDDING DISTRICT
Map 9 of 29 maps

SCALE: ½" = 1 Mile
Mt. Diablo Base and Meridian

UNITED STATES DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
CALIFORNIA DISTRICTS OF
BAKERSFIELD, SUSANVILLE, REDDING & FOLSOM

SUSTAINED YIELD UNIT 15





LEGEND

BLM COMMERCIAL FOREST LAND

AVAILABLE TIMBER PRODUCTION BASE
- 🟩 Intensive Timber Management Forest Land
- ▨ Restricted Forest Land

🟥 Withdrawn Forest Land

▨ BLM NON-COMMERCIAL FOREST LAND

SCALE: ½" = 1 Mile
Mt. Diablo Base and Meridian

REDDING DISTRICT
Map 10 of 29 maps

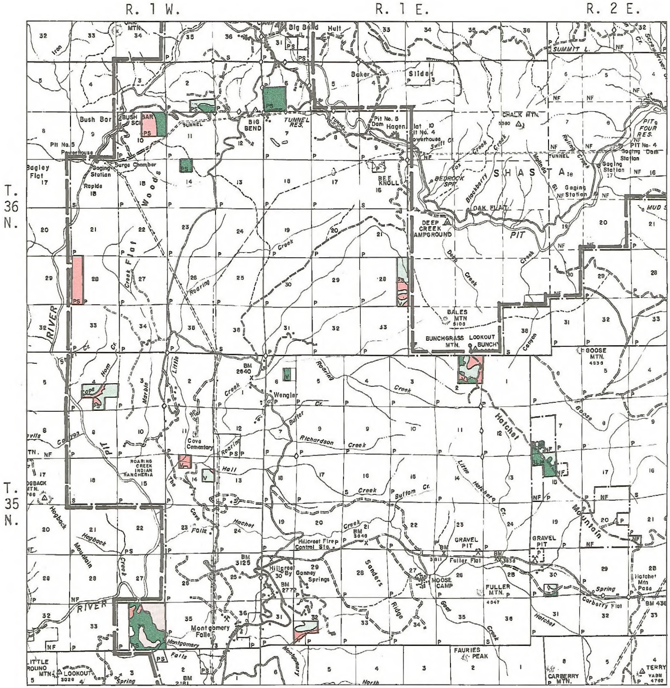
UNITED STATES DEPARTMENT OF THE INTERIOR

BUREAU OF LAND MANAGEMENT

CALIFORNIA DISTRICTS OF

BAKERSFIELD, SUSANVILLE, REDDING & FOLSOM

SUSTAINED YIELD UNIT 15



LEGEND

BLM COMMERCIAL FOREST LAND

AVAILABLE TIMBER PRODUCTION BASE
🟩 Intensive Timber Management Forest Land
▨ Restricted Forest Land

🟥 Withdrawn Forest Land

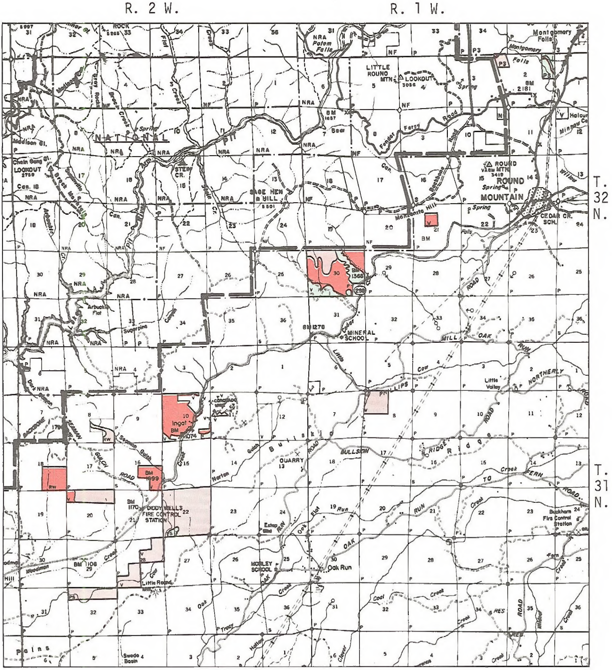
☐ BLM NON-COMMERCIAL FOREST LAND

REDDING DISTRICT
Map 11 of 29 maps

SCALE: ½" = 1 Mile
Mt. Diablo Base and Meridian

UNITED STATES DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
CALIFORNIA DISTRICTS OF
BAKERSFIELD, SUSANVILLE, REDDING & FOLSOM

SUSTAINED YIELD UNIT 15



LEGEND

BLM COMMERCIAL FOREST LAND

AVAILABLE TIMBER PRODUCTION BASE
- NONE Intensive Timber Management Forest Land
- 🟩 Restricted Forest Land
- 🟥 Withdrawn Forest Land

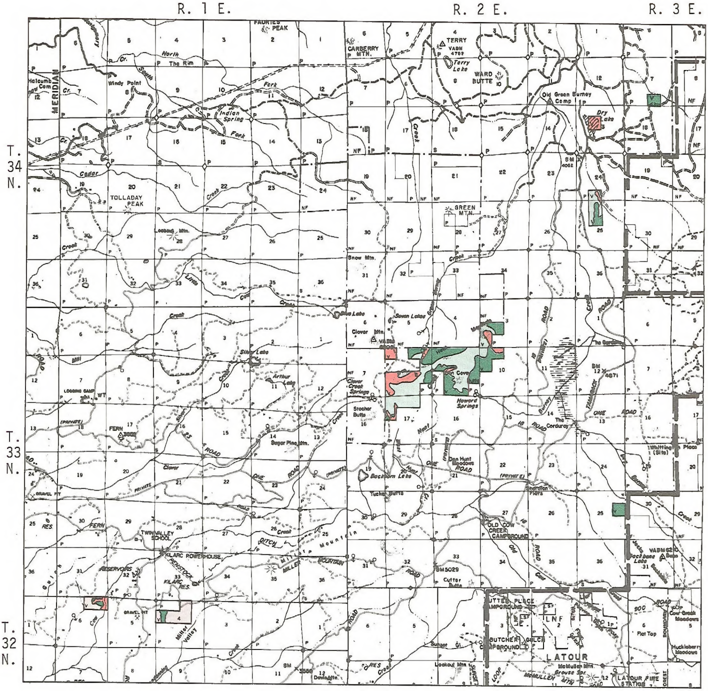
▨ BLM NON-COMMERCIAL FOREST LAND

SCALE: ½" = 1 Mile
Mt. Diablo Base and Meridian

REDDING DISTRICT
Map 12 of 29 maps

UNITED STATES DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
CALIFORNIA DISTRICTS OF
BAKERSFIELD, SUSANVILLE, REDDING & FOLSOM

SUSTAINED YIELD UNIT 15



LEGEND

BLM COMMERCIAL FOREST LAND

AVAILABLE TIMBER PRODUCTION BASE
🟩 Intensive Timber Management Forest Land
▨ Restricted Forest Land

🟥 Withdrawn Forest Land

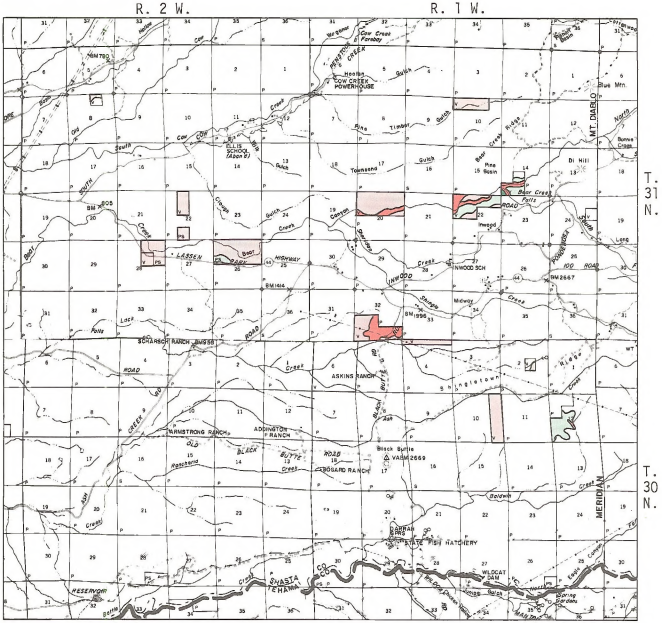
☐ BLM NON-COMMERCIAL FOREST LAND

SCALE: ½" = 1 Mile
Mt. Diablo Base and Meridian

REDDING DISTRICT
Map 13 of 29 maps

UNITED STATES DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
CALIFORNIA DISTRICTS OF
BAKERSFIELD, SUSANVILLE, REDDING & FOLSOM

SUSTAINED YIELD UNIT 15



LEGEND

BLM COMMERCIAL FOREST LAND

AVAILABLE TIMBER PRODUCTION BASE
- 🟩 Intensive Timber Management Forest Land
- ⬜ Restricted Forest Land

🟥 Withdrawn Forest Land

▨ BLM NON-COMMERCIAL FOREST LAND

SCALE: ½" = 1 Mile
Mt. Diablo Base and Meridian

REDDING DISTRICT
Map 14 of 29 maps

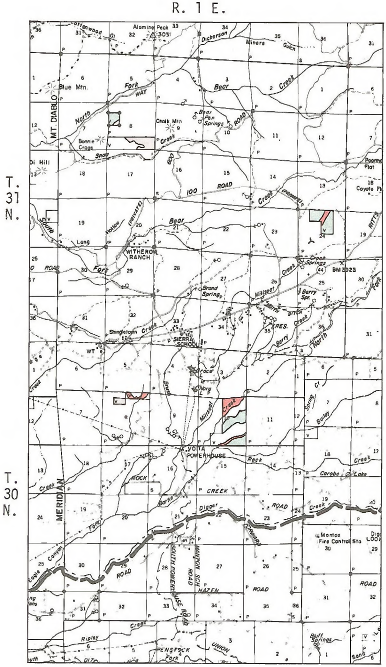
UNITED STATES DEPARTMENT OF THE INTERIOR

BUREAU OF LAND MANAGEMENT

CALIFORNIA DISTRICTS OF

BAKERSFIELD, SUSANVILLE, REDDING & FOLSOM

SUSTAINED YIELD UNIT 15



LEGEND

BLM COMMERCIAL FOREST LAND

AVAILABLE TIMBER PRODUCTION BASE
- NONE Intensive Timber Management Forest Land
- 🟩 Restricted Forest Land

🟥 Withdrawn Forest Land

⬜ BLM NON-COMMERCIAL FOREST LAND

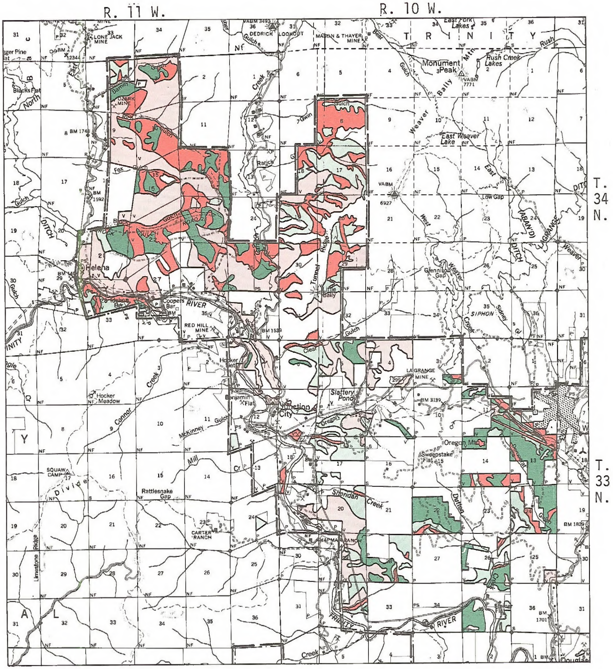
N

REDDING DISTRICT
Map 15 of 29 maps

SCALE: ½" = 1 Mile
Mt. Diablo Base and Meridian

UNITED STATES DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
CALIFORNIA DISTRICTS OF
BAKERSFIELD, SUSANVILLE, REDDING & FOLSOM

SUSTAINED YIELD UNIT 15



LEGEND

BLM COMMERCIAL FOREST LAND

AVAILABLE TIMBER PRODUCTION BASE
- 🟩 Intensive Timber Management Forest Land
- 🟩 Restricted Forest Land

🟥 Withdrawn Forest Land

🟥 BLM NON-COMMERCIAL FOREST LAND

SCALE: ½" = 1 Mile
Mt. Diablo Base and Meridian

REDDING DISTRICT
Map 16 of 29 maps

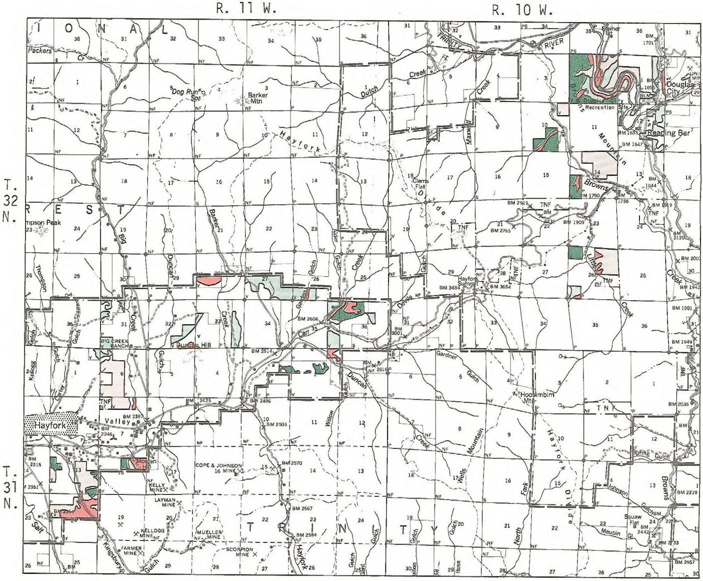
UNITED STATES DEPARTMENT OF THE INTERIOR

BUREAU OF LAND MANAGEMENT

CALIFORNIA DISTRICTS OF

BAKERSFIELD, SUSANVILLE, REDDING & FOLSOM

SUSTAINED YIELD UNIT 15



LEGEND

BLM COMMERCIAL FOREST LAND

AVAILABLE TIMBER PRODUCTION BASE
- 🟩 Intensive Timber Management Forest Land
- ▨ Restricted Forest Land

🟥 Withdrawn Forest Land

☐ BLM NON-COMMERCIAL FOREST LAND

N

SCALE: ½" = 1 Mile

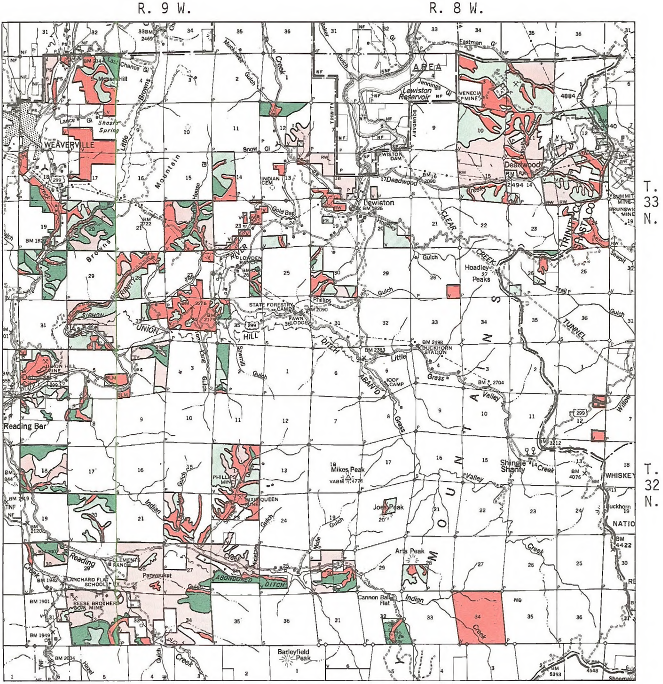
Mt. Diablo Base and Meridian

REDDING DISTRICT

Map 17 of 29 maps

UNITED STATES DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
CALIFORNIA DISTRICTS OF
BAKERSFIELD, SUSANVILLE, REDDING & FOLSOM

SUSTAINED YIELD UNIT 15



LEGEND

BLM COMMERCIAL FOREST LAND

AVAILABLE TIMBER PRODUCTION BASE
- 🟩 Intensive Timber Management Forest Land
- 🟩 Restricted Forest Land

🟥 Withdrawn Forest Land

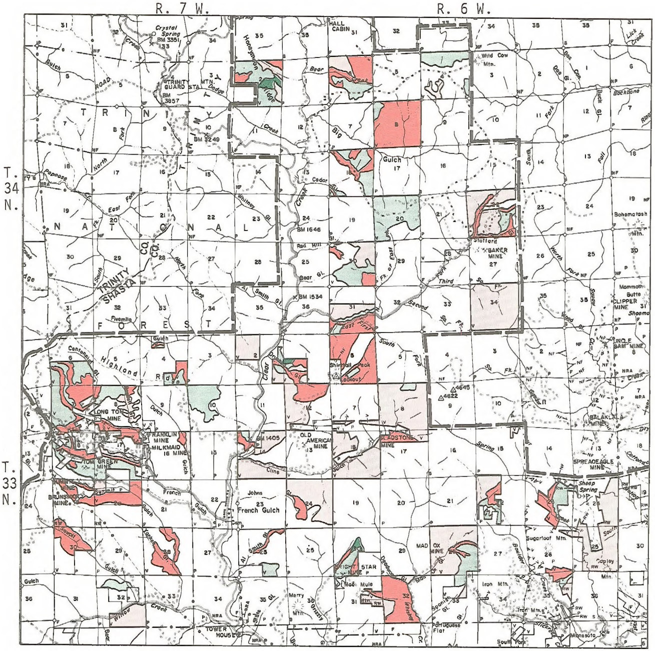
▨ BLM NON-COMMERCIAL FOREST LAND

SCALE: ½" = 1 Mile
Mt. Diablo Base and Meridian

REDDING DISTRICT
Map 18 of 29 maps

UNITED STATES DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
CALIFORNIA DISTRICTS OF
BAKERSFIELD, SUSANVILLE, REDDING & FOLSOM

SUSTAINED YIELD UNIT 15



LEGEND

BLM COMMERCIAL FOREST LAND

AVAILABLE TIMBER PRODUCTION BASE
🟩 Intensive Timber Management Forest Land
🟩 Restricted Forest Land

🟥 Withdrawn Forest Land

▢ BLM NON-COMMERCIAL FOREST LAND

SCALE: ½" = 1 Mile
Mt. Diablo Base and Meridian

REDDING DISTRICT
Map 19 of 29 maps

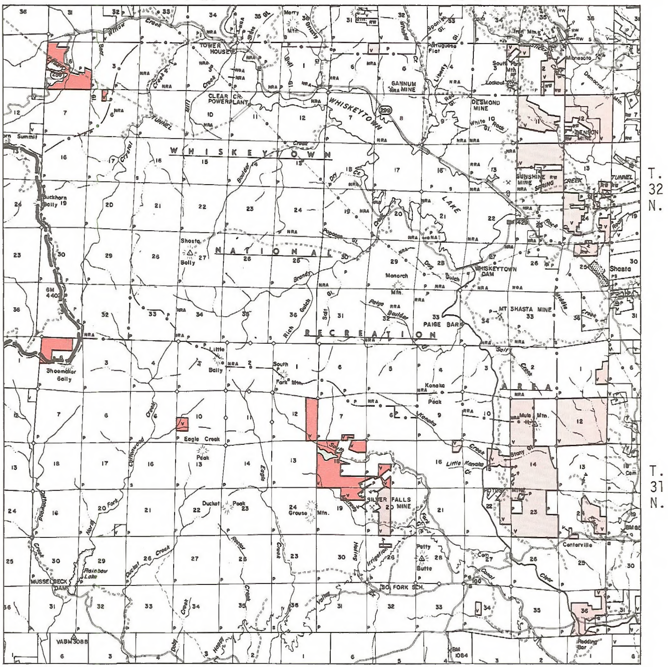
UNITED STATES DEPARTMENT OF THE INTERIOR

BUREAU OF LAND MANAGEMENT

CALIFORNIA DISTRICTS OF

BAKERSFIELD, SUSANVILLE, REDDING & FOLSOM

SUSTAINED YIELD UNIT 15



LEGEND

BLM COMMERCIAL FOREST LAND

AVAILABLE TIMBER PRODUCTION BASE
- NONE Intensive Timber Management Forest Land
- 🟩 Restricted Forest Land

🟥 Withdrawn Forest Land

▨ BLM NON-COMMERCIAL FOREST LAND

SCALE: ½" = 1 Mile

Mt. Diablo Base and Meridian

REDDING DISTRICT
Map 20 of 29 maps

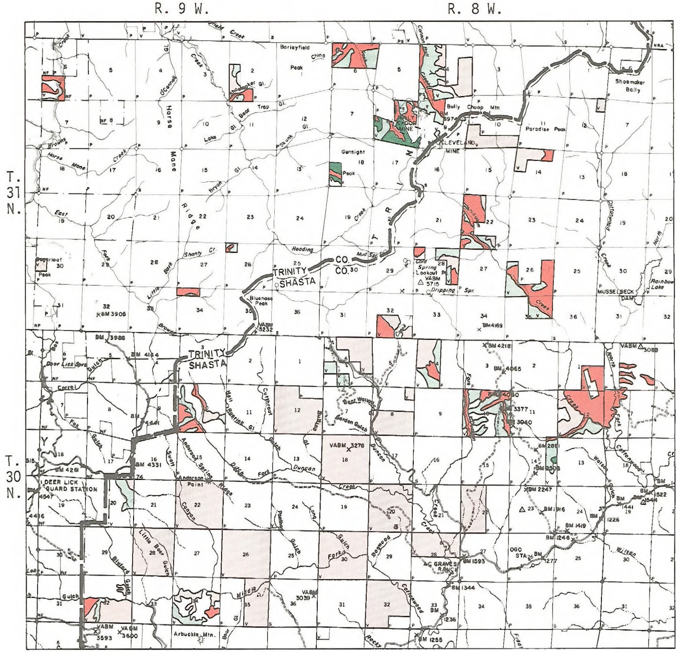
UNITED STATES DEPARTMENT OF THE INTERIOR

BUREAU OF LAND MANAGEMENT

CALIFORNIA DISTRICTS OF

BAKERSFIELD, SUSANVILLE, REDDING & FOLSOM

SUSTAINED YIELD UNIT 15



LEGEND

BLM COMMERCIAL FOREST LAND

AVAILABLE TIMBER PRODUCTION BASE
- 🟩 Intensive Timber Management Forest Land
- ▨ Restricted Forest Land

🟥 Withdrawn Forest Land

▢ BLM NON-COMMERCIAL FOREST LAND

N

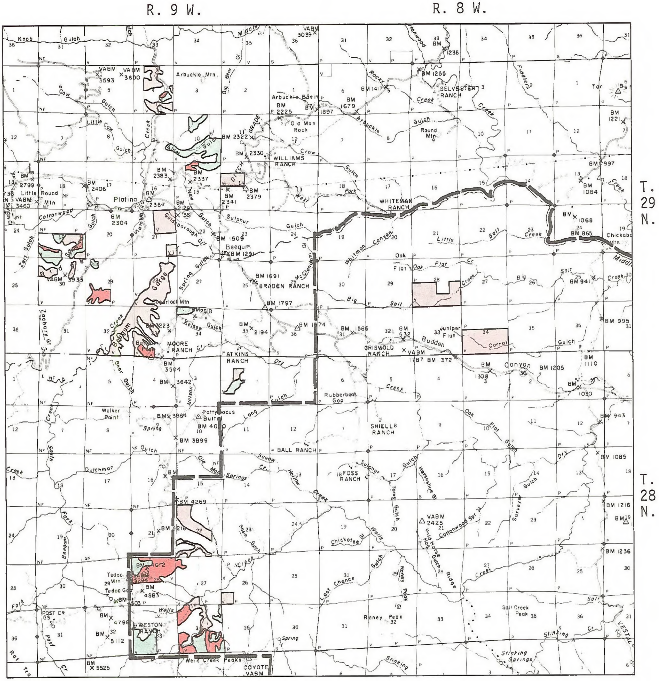
SCALE: ½" = 1 Mile

Mt. Diablo Base and Meridian

REDDING DISTRICT
Map 21 of 29 maps

UNITED STATES DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
CALIFORNIA DISTRICTS OF
BAKERSFIELD, SUSANVILLE, REDDING & FOLSOM

SUSTAINED YIELD UNIT 15



LEGEND

BLM COMMERCIAL FOREST LAND

AVAILABLE TIMBER PRODUCTION BASE
- NONE Intensive Timber Management Forest Land
- 🟩 Restricted Forest Land

🟥 Withdrawn Forest Land

▨ BLM NON-COMMERCIAL FOREST LAND

SCALE: ½" = 1 Mile
Mt. Diablo Base and Meridian

REDDING DISTRICT
Map 22 of 29 maps

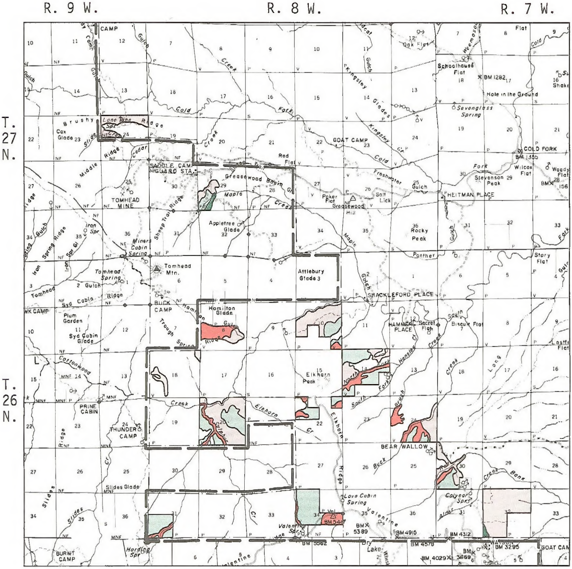
UNITED STATES DEPARTMENT OF THE INTERIOR

BUREAU OF LAND MANAGEMENT

CALIFORNIA DISTRICTS OF

BAKERSFIELD, SUSANVILLE, REDDING & FOLSOM

SUSTAINED YIELD UNIT 15



LEGEND

BLM COMMERCIAL FOREST LAND

AVAILABLE TIMBER PRODUCTION BASE
🟩 Intensive Timber Management Forest Land
▨ Restricted Forest Land

🟥 Withdrawn Forest Land

☐ BLM NON-COMMERCIAL FOREST LAND

N

SCALE: ½" = 1 Mile

Mt. Diablo Base and Meridian

REDDING DISTRICT
Map 23 of 29 maps

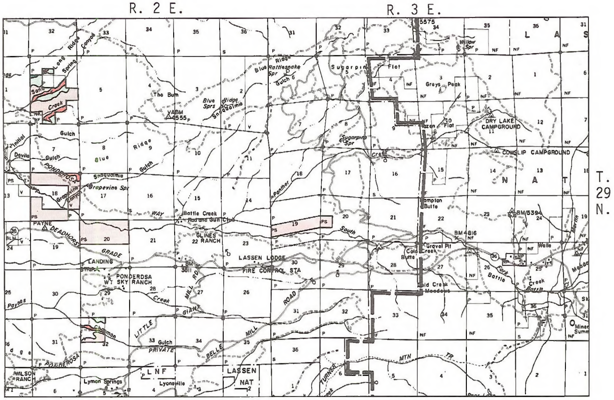
UNITED STATES DEPARTMENT OF THE INTERIOR

BUREAU OF LAND MANAGEMENT

CALIFORNIA DISTRICTS OF

BAKERSFIELD, SUSANVILLE, REDDING & FOLSOM

SUSTAINED YIELD UNIT 15



LEGEND

BLM COMMERCIAL FOREST LAND

AVAILABLE TIMBER PRODUCTION BASE
- 🟩 Intensive Timber Management Forest Land
- 🟩 Restricted Forest Land

🟥 Withdrawn Forest Land

⬜ BLM NON-COMMERCIAL FOREST LAND

SCALE: ½" = 1 Mile

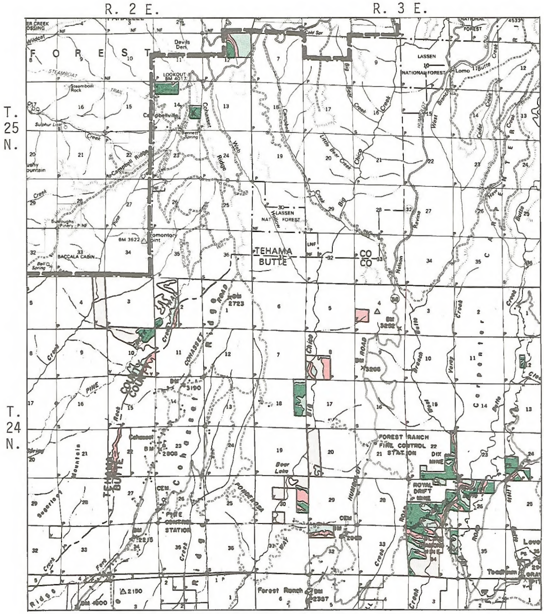
Mt. Diablo Base and Meridian

REDDING DISTRICT

Map 24 of 29 maps

UNITED STATES DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
CALIFORNIA DISTRICTS OF
BAKERSFIELD, SUSANVILLE, REDDING & FOLSOM

SUSTAINED YIELD UNIT 15



LEGEND

BLM COMMERCIAL FOREST LAND

AVAILABLE TIMBER PRODUCTION BASE
- 🟩 Intensive Timber Management Forest Land
- ▨ Restricted Forest Land

🟥 Withdrawn Forest Land

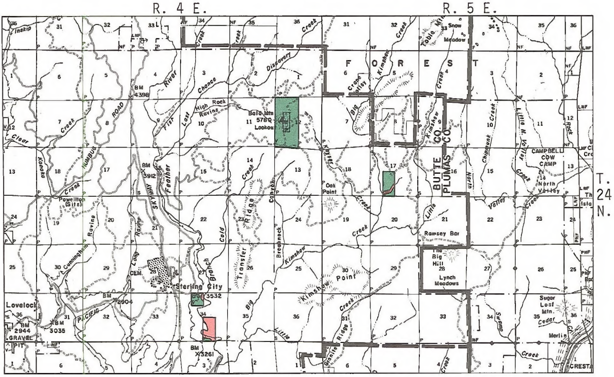
☐ BLM NON-COMMERCIAL FOREST LAND

SCALE: ½" = 1 Mile
Mt. Diablo Base and Meridian

REDDING DISTRICT
Map 25 of 29 maps

UNITED STATES DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
CALIFORNIA DISTRICTS OF
BAKERSFIELD, SUSANVILLE, REDDING & FOLSOM

SUSTAINED YIELD UNIT 15



LEGEND

BLM COMMERCIAL FOREST LAND

AVAILABLE TIMBER PRODUCTION BASE
- 🟩 Intensive Timber Management Forest Land
- ▨ Restricted Forest Land

🟥 Withdrawn Forest Land

NONE BLM NON-COMMERCIAL FOREST LAND

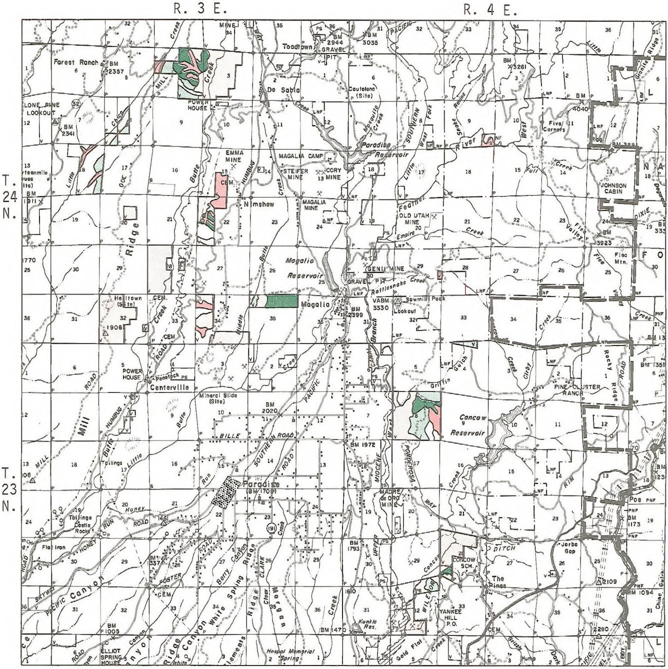
N

SCALE: ½" = 1 Mile
Mt. Diablo Base and Meridian

REDDING DISTRICT
Map 26 of 29 maps

UNITED STATES DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
CALIFORNIA DISTRICTS OF
BAKERSFIELD, SUSANVILLE, REDDING & FOLSOM

SUSTAINED YIELD UNIT 15



LEGEND

BLM COMMERCIAL FOREST LAND

AVAILABLE TIMBER PRODUCTION BASE
🟩 Intensive Timber Management Forest Land
▨ Restricted Forest Land
🟥 Withdrawn Forest Land

☐ BLM NON-COMMERCIAL FOREST LAND

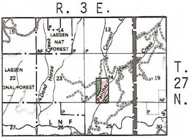
N

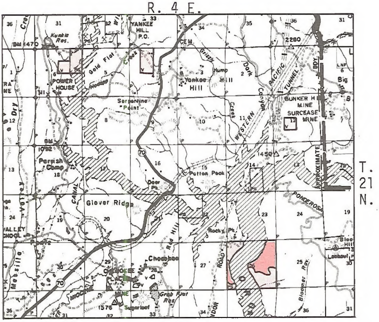
SCALE: ½" = 1 Mile
Mt. Diablo Base and Meridian

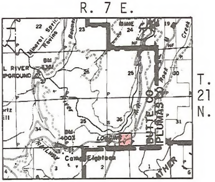
REDDING DISTRICT
Map 27 of 29 maps

UNITED STATES DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
CALIFORNIA DISTRICTS OF
BAKERSFIELD, SUSANVILLE, REDDING & FOLSOM

SUSTAINED YIELD UNIT 15







LEGEND

BLM COMMERCIAL FOREST LAND

AVAILABLE TIMBER PRODUCTION BASE { 🟩 Intensive Timber Management Forest Land
NONE Restricted Forest Land

🟥 Withdrawn Forest Land

▨ BLM NON-COMMERCIAL FOREST LAND

SCALE: ½" = 1 Mile

Mt. Diablo Base and Meridian

REDDING DISTRICT
Map 28 of 29 maps

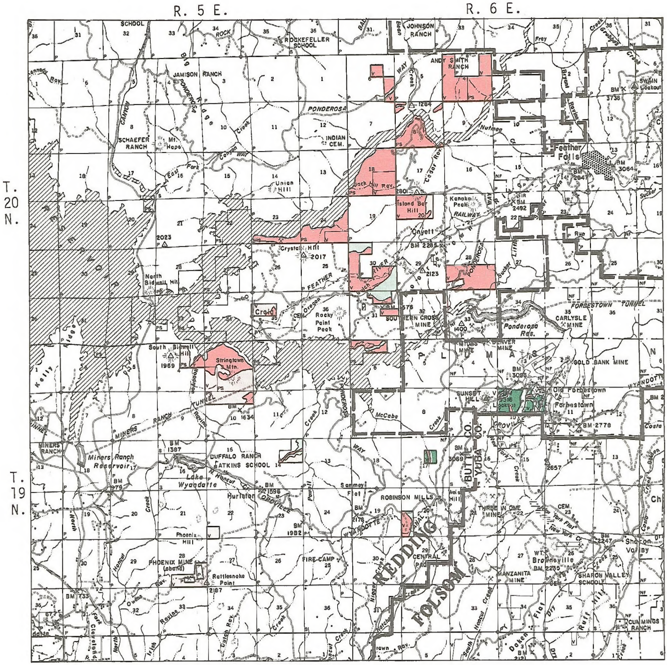
UNITED STATES DEPARTMENT OF THE INTERIOR

BUREAU OF LAND MANAGEMENT

CALIFORNIA DISTRICTS OF

BAKERSFIELD, SUSANVILLE, REDDING & FOLSOM

SUSTAINED YIELD UNIT 15



LEGEND

BLM COMMERCIAL FOREST LAND

AVAILABLE TIMBER PRODUCTION BASE
- 🟩 Intensive Timber Management Forest Land
- 🟩 Restricted Forest Land

🟥 Withdrawn Forest Land

☐ BLM NON-COMMERCIAL FOREST LAND

SCALE: ½" = 1 Mile

Mt. Diablo Base and Meridian

REDDING DISTRICT
Map 29 of 29 maps

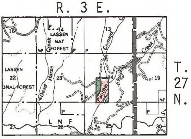
UNITED STATES DEPARTMENT OF THE INTERIOR

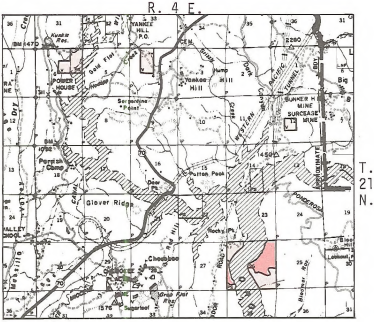
BUREAU OF LAND MANAGEMENT

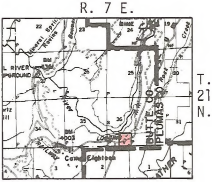
CALIFORNIA DISTRICTS OF

BAKERSFIELD, SUSANVILLE, REDDING & FOLSOM

SUSTAINED YIELD UNIT 15







LEGEND

BLM COMMERCIAL FOREST LAND

AVAILABLE TIMBER PRODUCTION BASE
- 🟩 Intensive Timber Management Forest Land
- NONE Restricted Forest Land

🟥 Withdrawn Forest Land

⬜ BLM NON-COMMERCIAL FOREST LAND

N

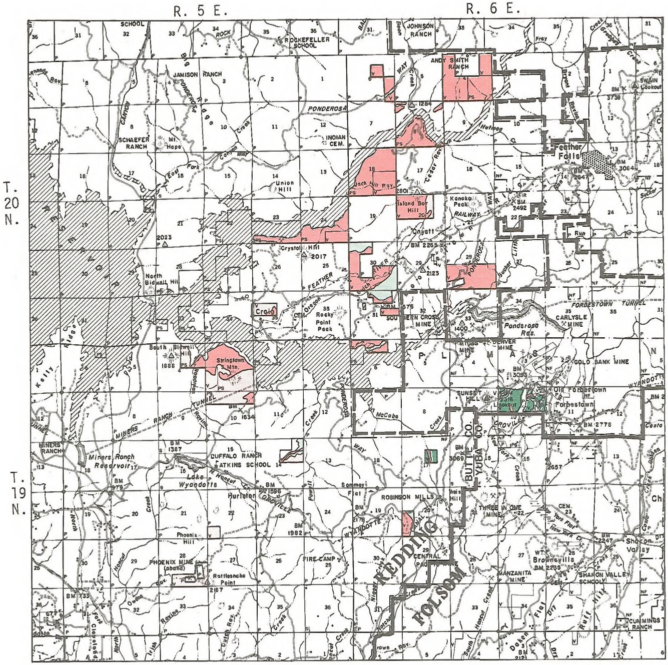
SCALE: ½" = 1 Mile

Mt. Diablo Base and Meridian

REDDING DISTRICT
Map 28 of 29 maps

UNITED STATES DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
CALIFORNIA DISTRICTS OF
BAKERSFIELD, SUSANVILLE, REDDING & FOLSOM

SUSTAINED YIELD UNIT 15



LEGEND

BLM COMMERCIAL FOREST LAND

AVAILABLE TIMBER PRODUCTION BASE
🟩 Intensive Timber Management Forest Land
🟩 Restricted Forest Land

🟥 Withdrawn Forest Land

☐ BLM NON-COMMERCIAL FOREST LAND

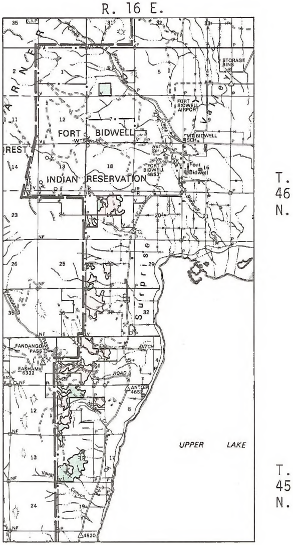
N

SCALE: ½" = 1 Mile
Mt. Diablo Base and Meridian

REDDING DISTRICT
Map 29 of 29 maps

UNITED STATES DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
CALIFORNIA DISTRICTS OF
BAKERSFIELD, SUSANVILLE, REDDING & FOLSOM

SUSTAINED YIELD UNIT 15



LEGEND

BLM COMMERCIAL FOREST LAND

AVAILABLE TIMBER PRODUCTION BASE
NONE Intensive Timber Management Forest Land
🟩 Restricted Forest Land

NONE Withdrawn Forest Land

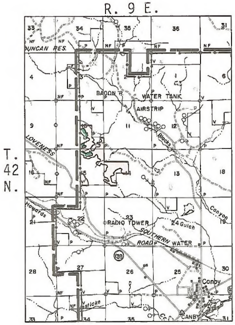
▢ BLM NON-COMMERCIAL FOREST LAND

SCALE: ½" = 1 Mile
Mt. Diablo Base and Meridian

SUSANVILLE DISTRICT
Map 1 of 27 maps

UNITED STATES DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
CALIFORNIA DISTRICTS OF
BAKERSFIELD, SUSANVILLE, REDDING & FOLSOM

SUSTAINED YIELD UNIT 15



LEGEND

BLM COMMERCIAL FOREST LAND

AVAILABLE TIMBER PRODUCTION BASE
- 🟩 Intensive Timber Management Forest Land
- NONE Restricted Forest Land

NONE Withdrawn Forest Land

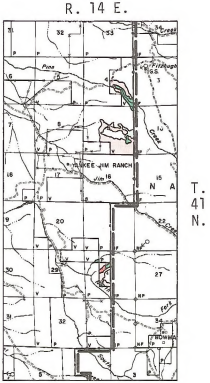
☐ BLM NON-COMMERCIAL FOREST LAND

SCALE: ½" = 1 Mile
Mt. Diablo Base and Meridian

SUSANVILLE DISTRICT
Map 2 of 27 maps

UNITED STATES DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
CALIFORNIA DISTRICTS OF
BAKERSFIELD, SUSANVILLE, REDDING & FOLSOM

SUSTAINED YIELD UNIT 15



LEGEND

BLM COMMERCIAL FOREST LAND

AVAILABLE TIMBER PRODUCTION BASE
🟩 Intensive Timber Management Forest Land
🟩 Restricted Forest Land

🟥 Withdrawn Forest Land

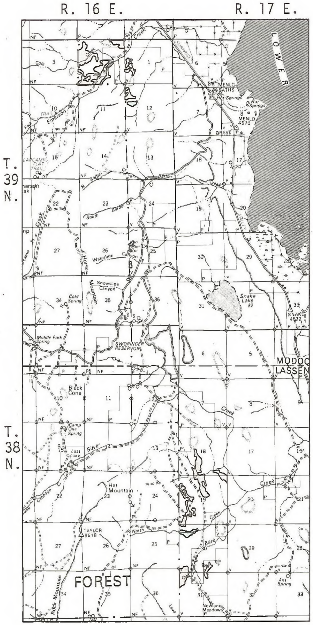
⬜ BLM NON-COMMERCIAL FOREST LAND

SCALE: ½" = 1 Mile
Mt. Diablo Base and Meridian

SUSANVILLE DISTRICT
Map 3 of 27 maps

UNITED STATES DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
CALIFORNIA DISTRICTS OF
BAKERSFIELD, SUSANVILLE, REDDING & FOLSOM

SUSTAINED YIELD UNIT 15



LEGEND

BLM COMMERCIAL FOREST LAND

AVAILABLE TIMBER PRODUCTION BASE
- NONE Intensive Timber Management Forest Land
- 🟩 Restricted Forest Land

NONE Withdrawn Forest Land

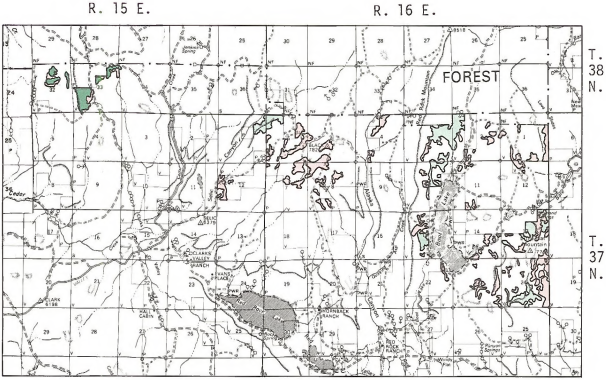
☐ BLM NON-COMMERCIAL FOREST LAND

SCALE: ½" = 1 Mile
Mt. Diablo Base and Meridian

SUSANVILLE DISTRICT
Map 4 of 27 maps

UNITED STATES DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
CALIFORNIA DISTRICTS OF
BAKERSFIELD, SUSANVILLE, REDDING & FOLSOM

SUSTAINED YIELD UNIT 15



LEGEND

BLM COMMERCIAL FOREST LAND

AVAILABLE TIMBER PRODUCTION BASE
- 🟩 Intensive Timber Management Forest Land
- ▢ Restricted Forest Land

NONE Withdrawn Forest Land

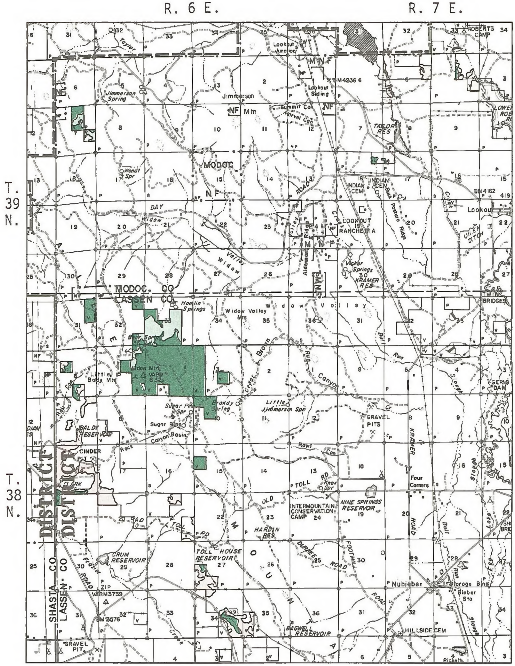
▢ BLM NON-COMMERCIAL FOREST LAND

SCALE: ½" = 1 Mile
Mt. Diablo Base and Meridian

SUSANVILLE DISTRICT
Map 5 of 27 maps

UNITED STATES DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
CALIFORNIA DISTRICTS OF
BAKERSFIELD, SUSANVILLE, REDDING & FOLSOM

SUSTAINED YIELD UNIT 15



LEGEND

BLM COMMERCIAL FOREST LAND

AVAILABLE TIMBER PRODUCTION BASE
🟩 Intensive Timber Management Forest Land
▢ Restricted Forest Land

NONE Withdrawn Forest Land

☐ BLM NON-COMMERCIAL FOREST LAND

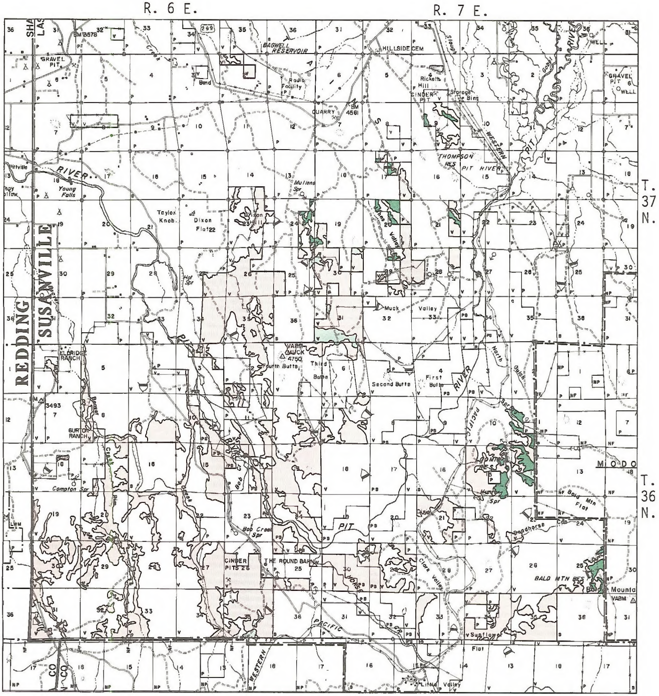
N

SCALE: ½" = 1 Mile
Mt. Diablo Base and Meridian

SUSANVILLE DISTRICT
Map 6 of 27 maps

UNITED STATES DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
CALIFORNIA DISTRICTS OF
BAKERSFIELD, SUSANVILLE, REDDING & FOLSOM

SUSTAINED YIELD UNIT 15



LEGEND

BLM COMMERCIAL FOREST LAND

AVAILABLE TIMBER PRODUCTION BASE
- 🟩 Intensive Timber Management Forest Land
- ▨ Restricted Forest Land

NONE Withdrawn Forest Land

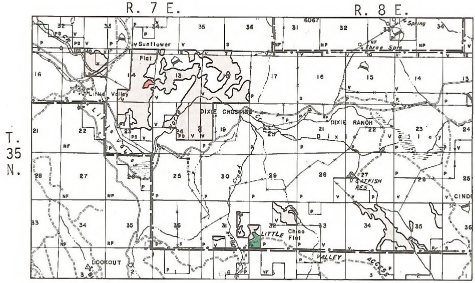
▭ BLM NON-COMMERCIAL FOREST LAND

SCALE: ½" = 1 Mile
Mt. Diablo Base and Meridian

SUSANVILLE DISTRICT
Map 7 of 27 maps

UNITED STATES DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
CALIFORNIA DISTRICTS OF
BAKERSFIELD, SUSANVILLE, REDDING & FOLSOM

SUSTAINED YIELD UNIT 15



LEGEND

BLM COMMERCIAL FOREST LAND

AVAILABLE TIMBER PRODUCTION BASE
🟩 Intensive Timber Management Forest Land
NONE Restricted Forest Land

🟥 Withdrawn Forest Land

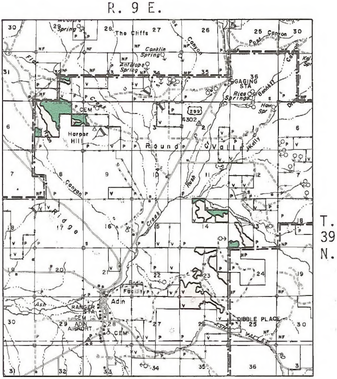
⬜ BLM NON-COMMERCIAL FOREST LAND

SUSANVILLE DISTRICT
Map 8 of 27 maps

SCALE: ½" = 1 Mile
Mt. Diablo Base and Meridian

UNITED STATES DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
CALIFORNIA DISTRICTS OF
BAKERSFIELD, SUSANVILLE, REDDING & FOLSOM

SUSTAINED YIELD UNIT 15



LEGEND

BLM COMMERCIAL FOREST LAND

AVAILABLE TIMBER PRODUCTION BASE
- 🟩 Intensive Timber Management Forest Land
- 🟩 Restricted Forest Land

NONE Withdrawn Forest Land

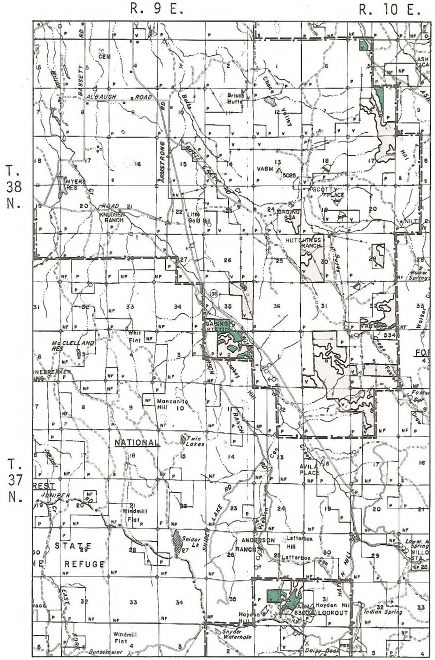
☐ BLM NON-COMMERCIAL FOREST LAND

SCALE: ½" = 1 Mile
Mt. Diablo Base and Meridian

SUSANVILLE DISTRICT
Map 9 of 27 maps

UNITED STATES DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
CALIFORNIA DISTRICTS OF
BAKERSFIELD, SUSANVILLE, REDDING & FOLSOM

SUSTAINED YIELD UNIT 15



LEGEND

BLM COMMERCIAL FOREST LAND

AVAILABLE TIMBER PRODUCTION BASE
- 🟩 Intensive Timber Management Forest Land
- ▨ Restricted Forest Land

NONE Withdrawn Forest Land

☐ BLM NON-COMMERCIAL FOREST LAND

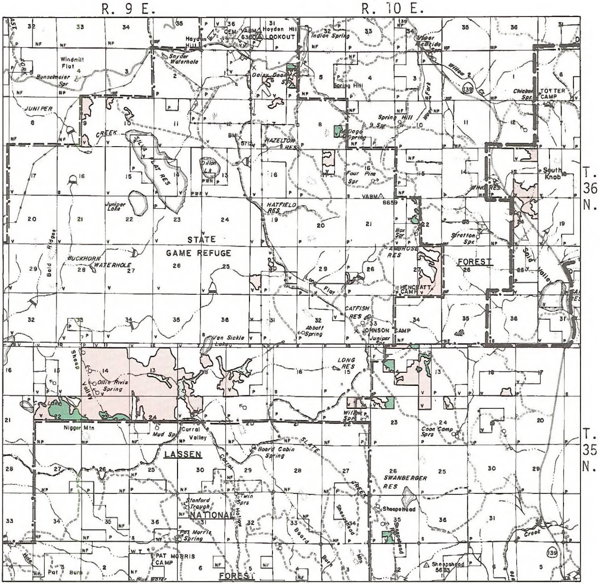
N

SCALE: ½" = 1 Mile
Mt. Diablo Base and Meridian

SUSANVILLE DISTRICT
Map 10 of 27 maps

UNITED STATES DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
CALIFORNIA DISTRICTS OF
BAKERSFIELD, SUSANVILLE, REDDING & FOLSOM

SUSTAINED YIELD UNIT 15



LEGEND

BLM COMMERCIAL FOREST LAND

AVAILABLE TIMBER PRODUCTION BASE
- 🟩 Intensive Timber Management Forest Land
- 🟩 Restricted Forest Land

NONE Withdrawn Forest Land

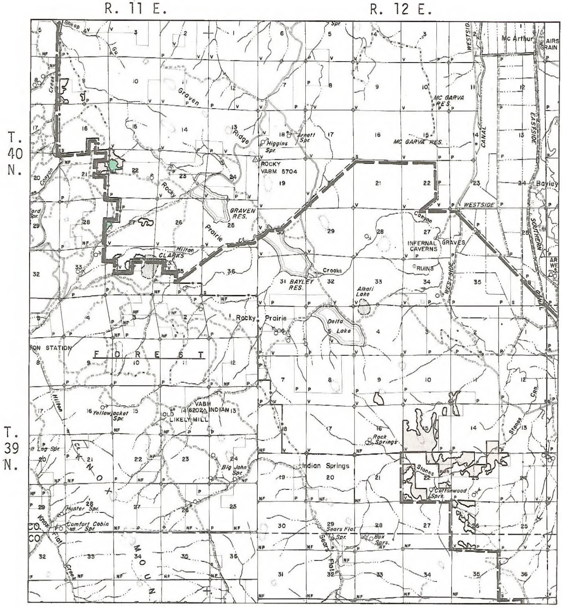
🟥 BLM NON-COMMERCIAL FOREST LAND

SCALE: ½" = 1 Mile
Mt. Diablo Base and Meridian

SUSANVILLE DISTRICT
Map 11 of 27 maps

UNITED STATES DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
CALIFORNIA DISTRICTS OF
BAKERSFIELD, SUSANVILLE, REDDING & FOLSOM

SUSTAINED YIELD UNIT 15



LEGEND

BLM COMMERCIAL FOREST LAND

AVAILABLE TIMBER PRODUCTION BASE
🟩 Intensive Timber Management Forest Land
□ Restricted Forest Land

NONE Withdrawn Forest Land

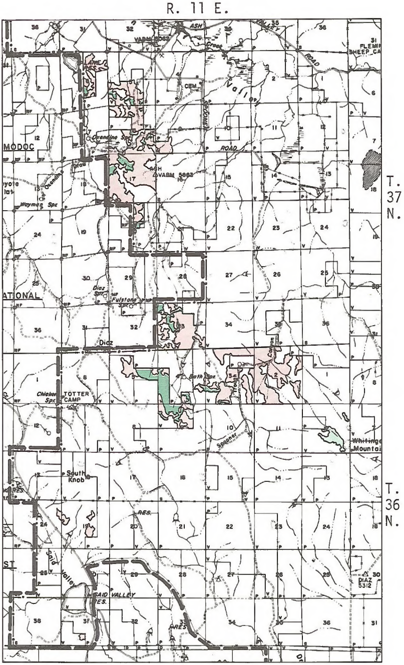
□ BLM NON-COMMERCIAL FOREST LAND

SCALE: ½" = 1 Mile
Mt. Diablo Base and Meridian

SUSANVILLE DISTRICT
Map 12 of 27 maps

UNITED STATES DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
CALIFORNIA DISTRICTS OF
BAKERSFIELD, SUSANVILLE, REDDING & FOLSOM

SUSTAINED YIELD UNIT 15



LEGEND

BLM COMMERCIAL FOREST LAND

AVAILABLE TIMBER PRODUCTION BASE
- 🟩 Intensive Timber Management Forest Land
- ▨ Restricted Forest Land

NONE Withdrawn Forest Land

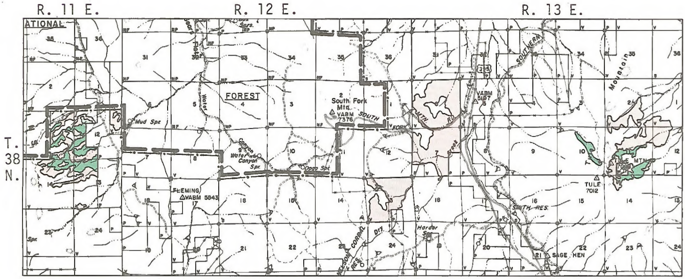
🟥 BLM NON-COMMERCIAL FOREST LAND

SCALE: ½" = 1 Mile
Mt. Diablo Base and Meridian

SUSANVILLE DISTRICT
Map 13 of 27 maps

UNITED STATES DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
CALIFORNIA DISTRICTS OF
BAKERSFIELD, SUSANVILLE, REDDING & FOLSOM

SUSTAINED YIELD UNIT 15



LEGEND

BLM COMMERCIAL FOREST LAND

AVAILABLE TIMBER PRODUCTION BASE
- 🟩 Intensive Timber Management Forest Land
- ☐ Restricted Forest Land

NONE Withdrawn Forest Land

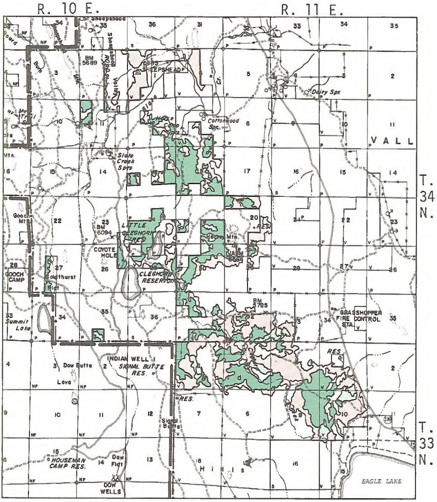
🟥 BLM NON-COMMERCIAL FOREST LAND

SUSANVILLE DISTRICT
Map 14 of 27 maps

SCALE: ½" = 1 Mile
Mt. Diablo Base and Meridian

UNITED STATES DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
CALIFORNIA DISTRICTS OF
BAKERSFIELD, SUSANVILLE, REDDING & FOLSOM

SUSTAINED YIELD UNIT 15



LEGEND

BLM COMMERCIAL FOREST LAND

AVAILABLE TIMBER PRODUCTION BASE
- 🟩 Intensive Timber Management Forest Land
- ▨ Restricted Forest Land

NONE Withdrawn Forest Land

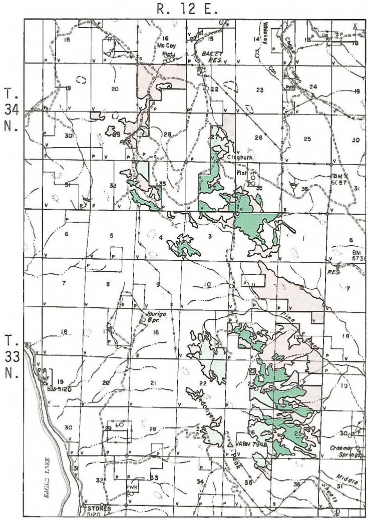
▧ BLM NON-COMMERCIAL FOREST LAND

SCALE: ½" = 1 Mile
Mt. Diablo Base and Meridian

SUSANVILLE DISTRICT
Map 15 of 27 maps

UNITED STATES DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
CALIFORNIA DISTRICTS OF
BAKERSFIELD, SUSANVILLE, REDDING & FOLSOM

SUSTAINED YIELD UNIT 15



LEGEND

BLM COMMERCIAL FOREST LAND

AVAILABLE TIMBER PRODUCTION BASE
🟩 Intensive Timber Management Forest Land
▢ Restricted Forest Land
NONE Withdrawn Forest Land

▨ BLM NON-COMMERCIAL FOREST LAND

SCALE: ½" = 1 Mile
Mt. Diablo Base and Meridian

SUSANVILLE DISTRICT
Map 16 of 27 maps

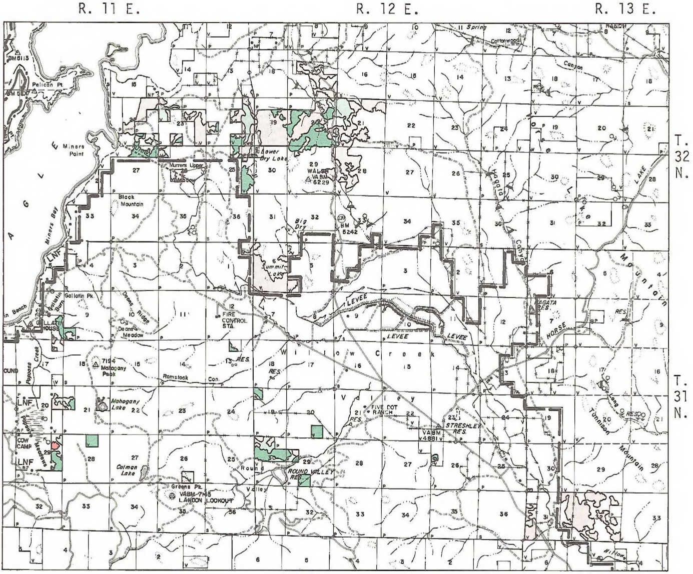
UNITED STATES DEPARTMENT OF THE INTERIOR

BUREAU OF LAND MANAGEMENT

CALIFORNIA DISTRICTS OF

BAKERSFIELD, SUSANVILLE, REDDING & FOLSOM

SUSTAINED YIELD UNIT 15



LEGEND

BLM COMMERCIAL FOREST LAND

AVAILABLE TIMBER PRODUCTION BASE

🟩 Intensive Timber Management Forest Land

🟩 Restricted Forest Land

🟥 Withdrawn Forest Land

🟪 BLM NON-COMMERCIAL FOREST LAND

SCALE: ½" = 1 Mile

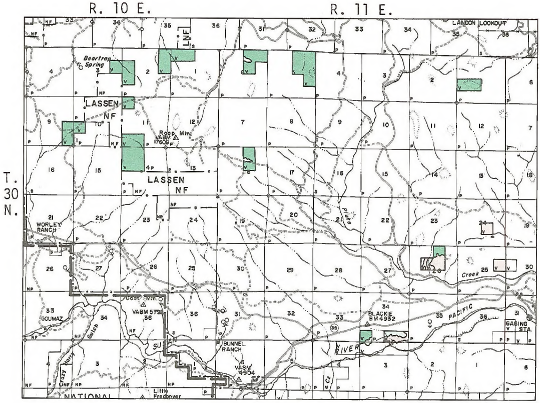
Mt. Diablo Base and Meridian

SUSANVILLE DISTRICT

Map 17 of 27 maps

UNITED STATES DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
CALIFORNIA DISTRICTS OF
BAKERSFIELD, SUSANVILLE, REDDING & FOLSOM

SUSTAINED YIELD UNIT 15



LEGEND

BLM COMMERCIAL FOREST LAND

AVAILABLE TIMBER PRODUCTION BASE
- 🟩 Intensive Timber Management Forest Land
- ☐ Restricted Forest Land

NONE Withdrawn Forest Land

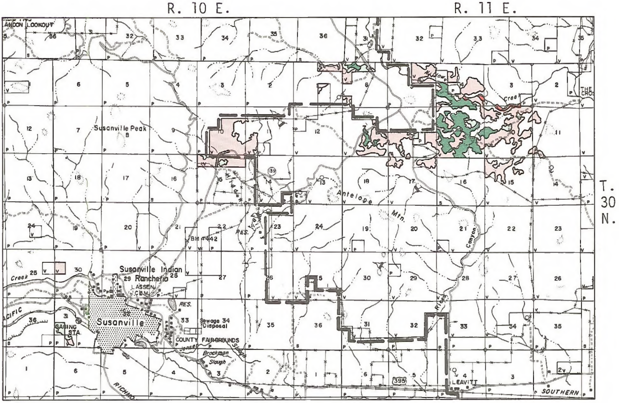
☐ BLM NON-COMMERCIAL FOREST LAND

SCALE: ½" = 1 Mile
Mt. Diablo Base and Meridian

SUSANVILLE DISTRICT
Map 18 of 27 maps

UNITED STATES DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
CALIFORNIA DISTRICTS OF
BAKERSFIELD, SUSANVILLE, REDDING & FOLSOM

SUSTAINED YIELD UNIT 15



LEGEND

BLM COMMERCIAL FOREST LAND

AVAILABLE TIMBER PRODUCTION BASE
🟩 Intensive Timber Management Forest Land
⬜ Restricted Forest Land

🟥 Withdrawn Forest Land

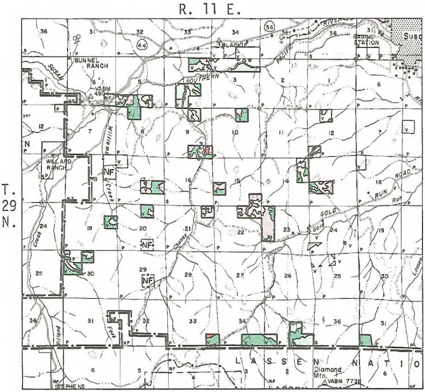
▨ BLM NON-COMMERCIAL FOREST LAND

SCALE: ½" = 1 Mile
Mt. Diablo Base and Meridian

SUSANVILLE DISTRICT
Map 19 of 27 maps

UNITED STATES DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
CALIFORNIA DISTRICTS OF
BAKERSFIELD, SUSANVILLE, REDDING & FOLSOM

SUSTAINED YIELD UNIT 15



LEGEND

BLM COMMERCIAL FOREST LAND

AVAILABLE TIMBER PRODUCTION BASE
- 🟩 Intensive Timber Management Forest Land
- ⬜ Restricted Forest Land

🟥 Withdrawn Forest Land

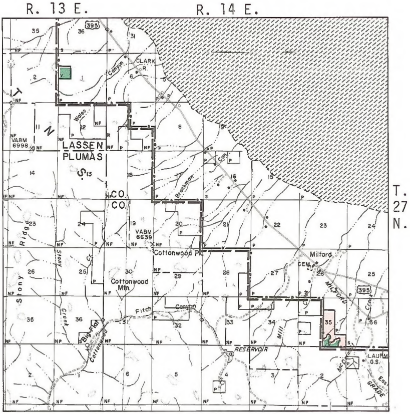
⬜ BLM NON-COMMERCIAL FOREST LAND

SCALE: ½" = 1 Mile
Mt. Diablo Base and Meridian

SUSANVILLE DISTRICT
Map 20 of 27 maps

UNITED STATES DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
CALIFORNIA DISTRICTS OF
BAKERSFIELD, SUSANVILLE, REDDING & FOLSOM

SUSTAINED YIELD UNIT 15



LEGEND

BLM COMMERCIAL FOREST LAND

AVAILABLE TIMBER PRODUCTION BASE
- 🟩 Intensive Timber Management Forest Land
- NONE Restricted Forest Land

NONE Withdrawn Forest Land

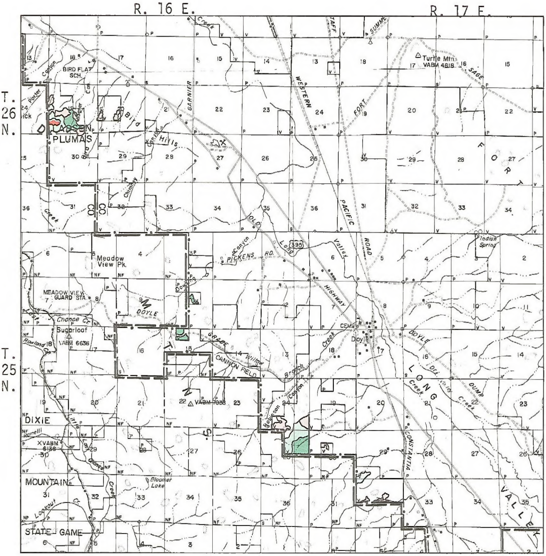
🟥 BLM NON-COMMERCIAL FOREST LAND

SCALE: ½" = 1 Mile
Mt. Diablo Base and Meridian

SUSANVILLE DISTRICT
Map 21 of 27 maps

UNITED STATES DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
CALIFORNIA DISTRICTS OF
BAKERSFIELD, SUSANVILLE, REDDING & FOLSOM

SUSTAINED YIELD UNIT 15



LEGEND

BLM COMMERCIAL FOREST LAND

AVAILABLE TIMBER PRODUCTION BASE
🟩 Intensive Timber Management Forest Land
🟩 Restricted Forest Land

🟥 Withdrawn Forest Land

☐ BLM NON-COMMERCIAL FOREST LAND

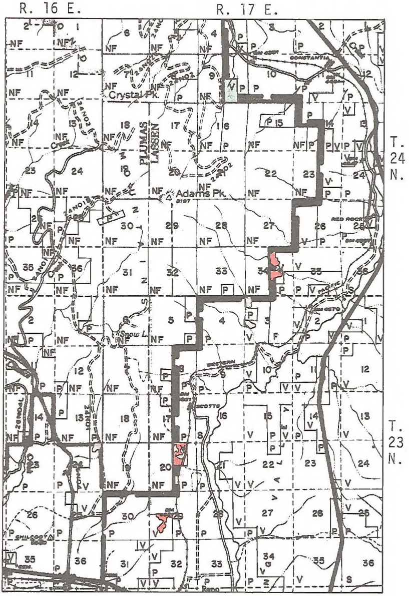
N

SCALE: ½" = 1 Mile
Mt. Diablo Base and Meridian

SUSANVILLE DISTRICT
Map 22 of 27 maps

UNITED STATES DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
CALIFORNIA DISTRICTS OF
BAKERSFIELD, SUSANVILLE, REDDING & FOLSOM

SUSTAINED YIELD UNIT 15



LEGEND

BLM COMMERCIAL FOREST LAND

AVAILABLE TIMBER PRODUCTION BASE
NONE Intensive Timber Management Forest Land
🟩 Restricted Forest Land

🟥 Withdrawn Forest Land

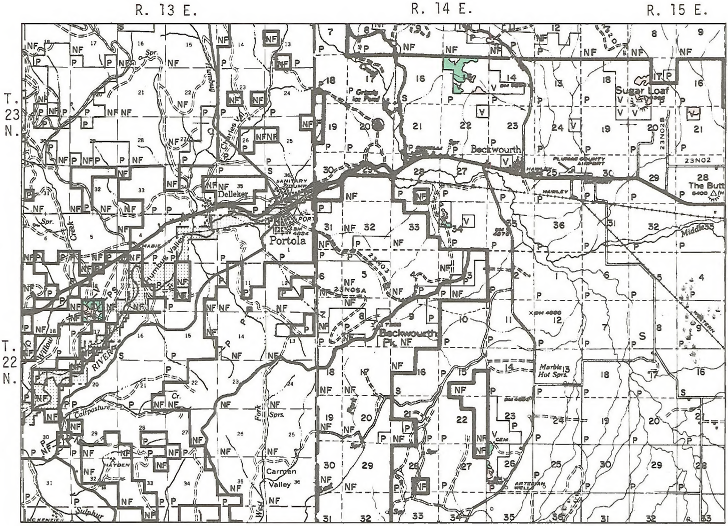
☐ BLM NON-COMMERCIAL FOREST LAND

SCALE: ½" = 1 Mile
Mt. Diablo Base and Meridian

SUSANVILLE DISTRICT
Map 23 of 27 maps

UNITED STATES DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
CALIFORNIA DISTRICTS OF
BAKERSFIELD, SUSANVILLE, REDDING & FOLSOM

SUSTAINED YIELD UNIT 15



LEGEND

BLM COMMERCIAL FOREST LAND

AVAILABLE TIMBER PRODUCTION BASE
- 🟩 Intensive Timber Management Forest Land
- NONE Restricted Forest Land

NONE Withdrawn Forest Land

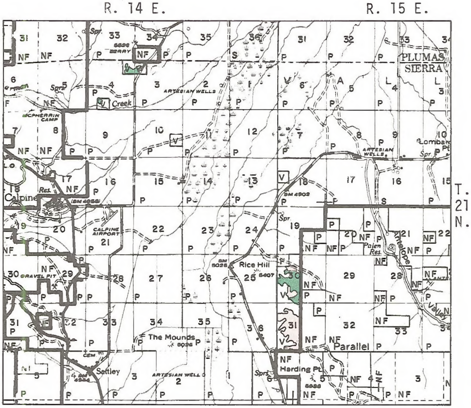
⬜ BLM NON-COMMERCIAL FOREST LAND

SCALE: ½" = 1 Mile
Mt. Diablo Base and Meridian

SUSANVILLE DISTRICT
Map 24 of 27 maps

UNITED STATES DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
CALIFORNIA DISTRICTS OF
BAKERSFIELD, SUSANVILLE, REDDING & FOLSOM

SUSTAINED YIELD UNIT 15



LEGEND

BLM COMMERCIAL FOREST LAND

AVAILABLE TIMBER PRODUCTION BASE
🟩 Intensive Timber Management Forest Land
NONE Restricted Forest Land

NONE Withdrawn Forest Land

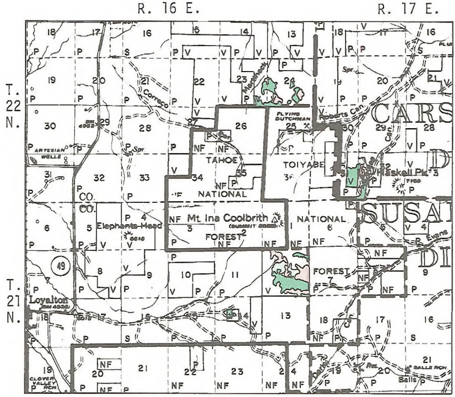
▨ BLM NON-COMMERCIAL FOREST LAND

SCALE: ½" = 1 Mile
Mt. Diablo Base and Meridian

SUSANVILLE DISTRICT
Map 25 of 27 maps

UNITED STATES DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
CALIFORNIA DISTRICTS OF
BAKERSFIELD, SUSANVILLE, REDDING & FOLSOM

SUSTAINED YIELD UNIT 15



LEGEND

BLM COMMERCIAL FOREST LAND

AVAILABLE TIMBER PRODUCTION BASE
🟩 Intensive Timber Management Forest Land
▢ Restricted Forest Land

NONE Withdrawn Forest Land

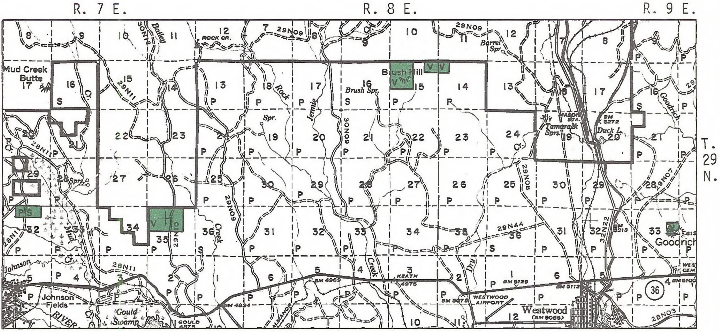
▢ BLM NON-COMMERCIAL FOREST LAND

SCALE: ½" = 1 Mile
Mt. Diablo Base and Meridian

SUSANVILLE DISTRICT
Map 26 of 27 maps

UNITED STATES DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
CALIFORNIA DISTRICTS OF
BAKERSFIELD, SUSANVILLE, REDDING & FOLSOM

SUSTAINED YIELD UNIT 15



LEGEND

BLM COMMERCIAL FOREST LAND

AVAILABLE TIMBER PRODUCTION BASE
🟩 Intensive Timber Management Forest Land
NONE Restricted Forest Land

NONE Withdrawn Forest Land

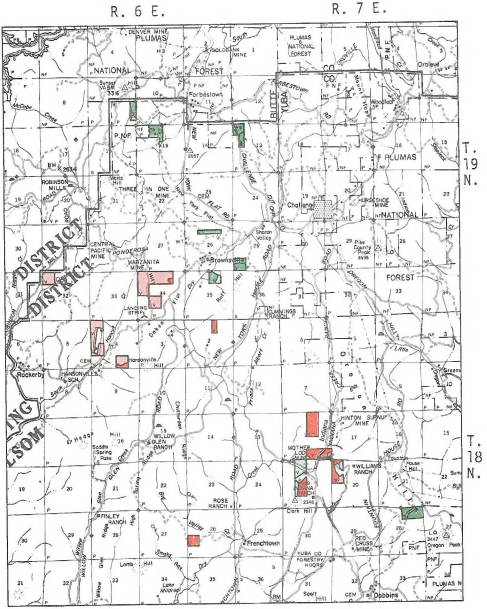
NONE BLM NON-COMMERCIAL FOREST LAND

SCALE: ½" = 1 Mile
Mt. Diablo Base and Meridian

SUSANVILLE DISTRICT
Map 27 of 27 maps

UNITED STATES DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
CALIFORNIA DISTRICTS OF
BAKERSFIELD, SUSANVILLE, REDDING & FOLSOM

SUSTAINED YIELD UNIT 15



LEGEND

BLM COMMERCIAL FOREST LAND

AVAILABLE TIMBER PRODUCTION BASE
- 🟩 Intensive Timber Management Forest Land
- 🟩 Restricted Forest Land

🟥 Withdrawn Forest Land

🟥 BLM NON-COMMERCIAL FOREST LAND

SCALE: ½" = 1 Mile
Mt. Diablo Base and Meridian

FOLSOM DISTRICT
Map 1 of 20 maps

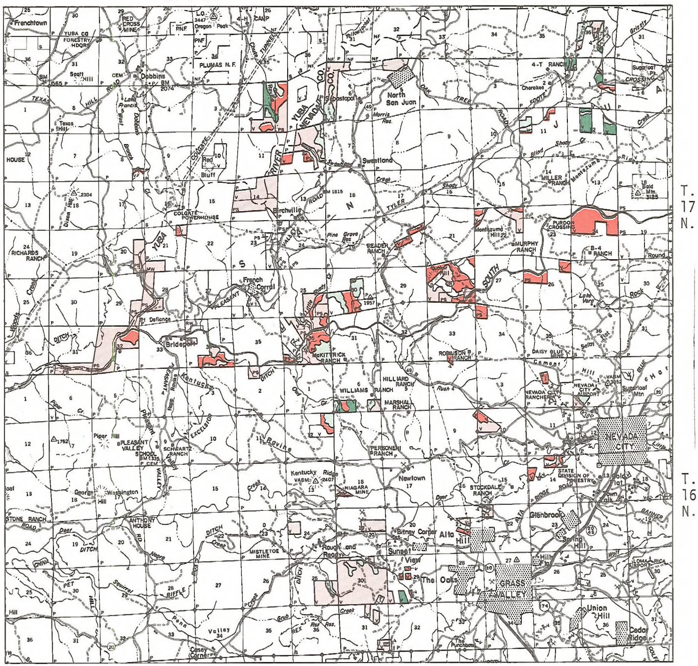
UNITED STATES DEPARTMENT OF THE INTERIOR

BUREAU OF LAND MANAGEMENT

CALIFORNIA DISTRICTS OF

BAKERSFIELD, SUSANVILLE, REDDING & FOLSOM

SUSTAINED YIELD UNIT 15



LEGEND

BLM COMMERCIAL FOREST LAND

AVAILABLE TIMBER PRODUCTION BASE		
	🟩	Intensive Timber Management Forest Land
	▨	Restricted Forest Land
	🟥	Withdrawn Forest Land
	▨	BLM NON-COMMERCIAL FOREST LAND

N

SCALE: ½" = 1 Mile

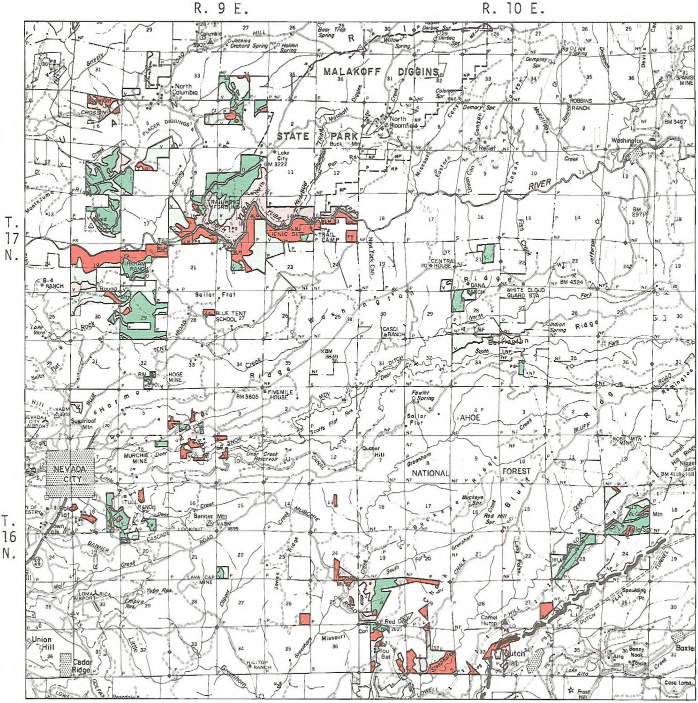
Mt. Diablo Base and Meridian

FOLSOM DISTRICT

Map 2 of 20 maps

UNITED STATES DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
CALIFORNIA DISTRICTS OF
BAKERSFIELD, SUSANVILLE, REDDING & FOLSOM

SUSTAINED YIELD UNIT 15



LEGEND

BLM COMMERCIAL FOREST LAND

AVAILABLE TIMBER PRODUCTION BASE
- 🟩 Intensive Timber Management Forest Land
- 🟩 Restricted Forest Land

🟥 Withdrawn Forest Land

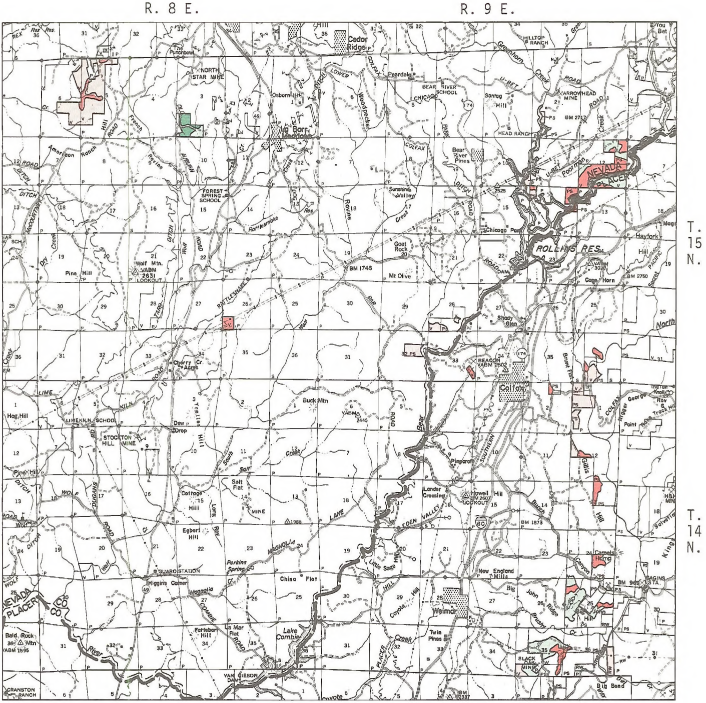
▨ BLM NON-COMMERCIAL FOREST LAND

FOLSOM DISTRICT
Map 3 of 20 maps

SCALE: ½" = 1 Mile
Mt. Diablo Base and Meridian

UNITED STATES DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
CALIFORNIA DISTRICTS OF
BAKERSFIELD, SUSANVILLE, REDDING & FOLSOM

SUSTAINED YIELD UNIT 15



LEGEND

BLM COMMERCIAL FOREST LAND

AVAILABLE TIMBER PRODUCTION BASE
- 🟩 Intensive Timber Management Forest Land
- ☐ Restricted Forest Land

🟥 Withdrawn Forest Land

☐ BLM NON-COMMERCIAL FOREST LAND

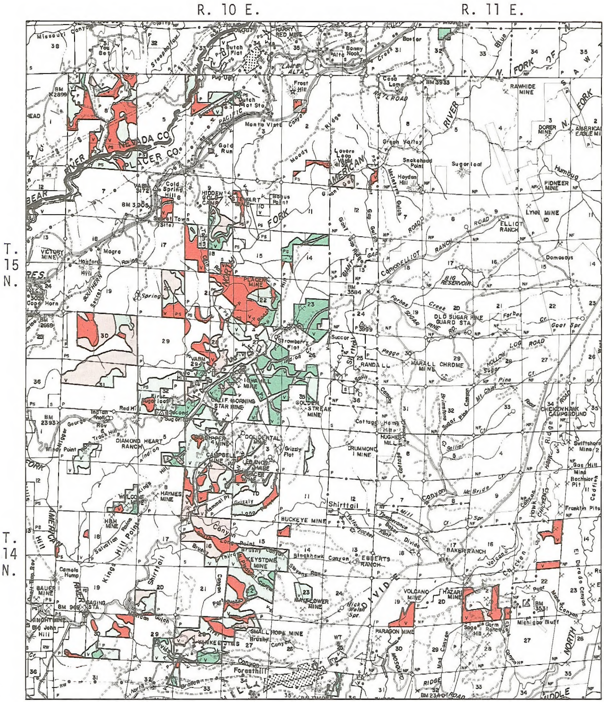
N

SCALE: ½" = 1 Mile
Mt. Diablo Base and Meridian

FOLSOM DISTRICT
Map 4 of 20 maps

UNITED STATES DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
CALIFORNIA DISTRICTS OF
BAKERSFIELD, SUSANVILLE, REDDING & FOLSOM

SUSTAINED YIELD UNIT 15



LEGEND

BLM COMMERCIAL FOREST LAND

AVAILABLE TIMBER PRODUCTION BASE
- 🟩 Intensive Timber Management Forest Land
- □ Restricted Forest Land

🟥 Withdrawn Forest Land

□ BLM NON-COMMERCIAL FOREST LAND

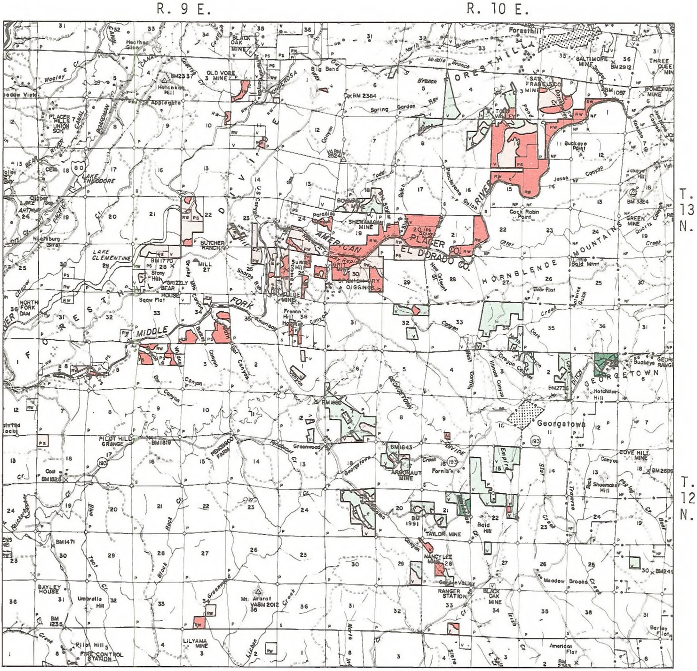
N

SCALE: ½" = 1 Mile
Mt. Diablo Base and Meridian

FOLSOM DISTRICT
Map 5 of 20 maps

UNITED STATES DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
CALIFORNIA DISTRICTS OF
BAKERSFIELD, SUSANVILLE, REDDING & FOLSOM

SUSTAINED YIELD UNIT 15



LEGEND

BLM COMMERCIAL FOREST LAND

AVAILABLE TIMBER PRODUCTION BASE
🟩 Intensive Timber Management Forest Land
🟩 Restricted Forest Land

🟥 Withdrawn Forest Land

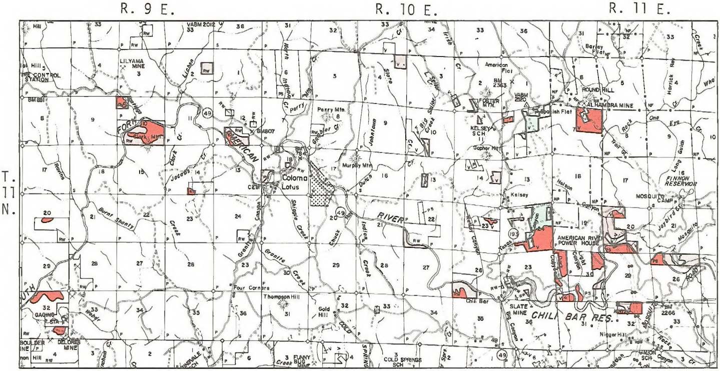
⬜ BLM NON-COMMERCIAL FOREST LAND

SCALE: ½" = 1 Mile
Mt. Diablo Base and Meridian

FOLSOM DISTRICT
Map 6 of 20 maps

UNITED STATES DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
CALIFORNIA DISTRICTS OF
BAKERSFIELD, SUSANVILLE, REDDING & FOLSOM

SUSTAINED YIELD UNIT 15



LEGEND

BLM COMMERCIAL FOREST LAND

AVAILABLE TIMBER PRODUCTION BASE
NONE Intensive Timber Management Forest Land
🟩 Restricted Forest Land

🟥 Withdrawn Forest Land

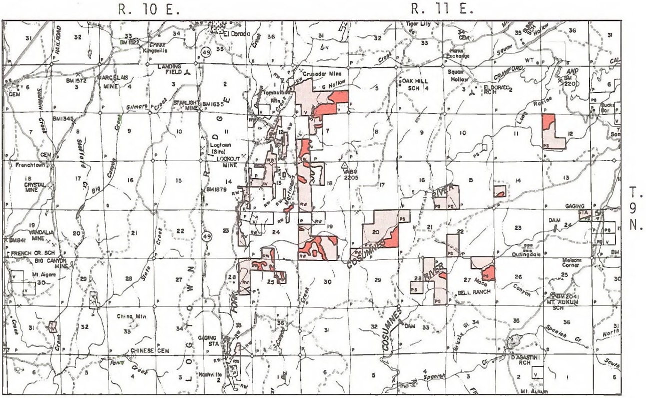
▨ BLM NON-COMMERCIAL FOREST LAND

SCALE: ½" = 1 Mile
Mt. Diablo Base and Meridian

FOLSOM DISTRICT
Map 7 of 20 maps

UNITED STATES DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
CALIFORNIA DISTRICTS OF
BAKERSFIELD, SUSANVILLE, REDDING & FOLSOM

SUSTAINED YIELD UNIT 15



LEGEND

BLM COMMERCIAL FOREST LAND

AVAILABLE TIMBER PRODUCTION BASE { NONE Intensive Timber Management Forest Land
🟩 Restricted Forest Land

🟥 Withdrawn Forest Land

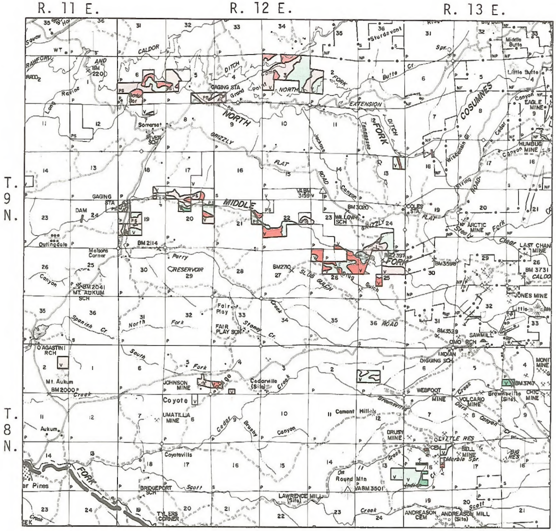
▨ BLM NON-COMMERCIAL FOREST LAND

SCALE: ½" = 1 Mile
Mt. Diablo Base and Meridian

FOLSOM DISTRICT
Map 8 of 20 maps

UNITED STATES DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
CALIFORNIA DISTRICTS OF
BAKERSFIELD, SUSANVILLE, REDDING & FOLSOM

SUSTAINED YIELD UNIT 15



LEGEND

BLM COMMERCIAL FOREST LAND

AVAILABLE TIMBER PRODUCTION BASE
🟩 Intensive Timber Management Forest Land
⬜ Restricted Forest Land

🟥 Withdrawn Forest Land

⬜ BLM NON-COMMERCIAL FOREST LAND

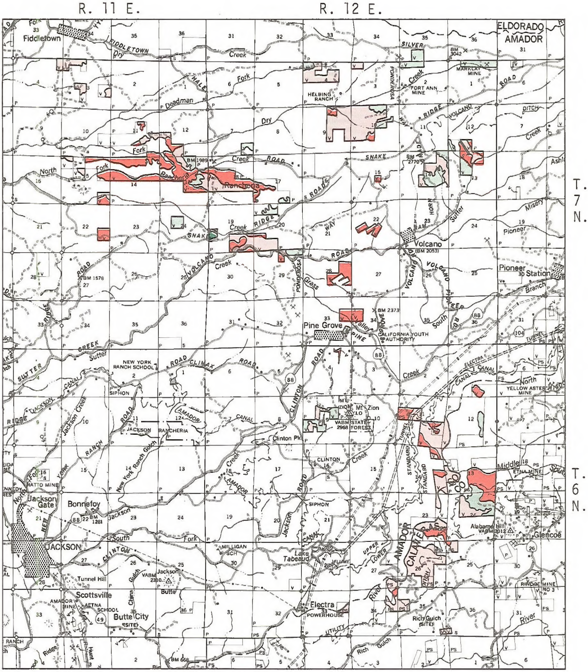
N

SCALE: ½" = 1 Mile
Mt. Diablo Base and Meridian

FOLSOM DISTRICT
Map 9 of 20 maps

UNITED STATES DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
CALIFORNIA DISTRICTS OF
BAKERSFIELD, SUSANVILLE, REDDING & FOLSOM

SUSTAINED YIELD UNIT 15



LEGEND

BLM COMMERCIAL FOREST LAND

AVAILABLE TIMBER PRODUCTION BASE
- 🟩 Intensive Timber Management Forest Land
- 🟩 Restricted Forest Land

🟥 Withdrawn Forest Land

🟫 BLM NON-COMMERCIAL FOREST LAND

SCALE: ½" = 1 Mile
Mt. Diablo Base and Meridian

FOLSOM DISTRICT
Map 10 of 20 maps

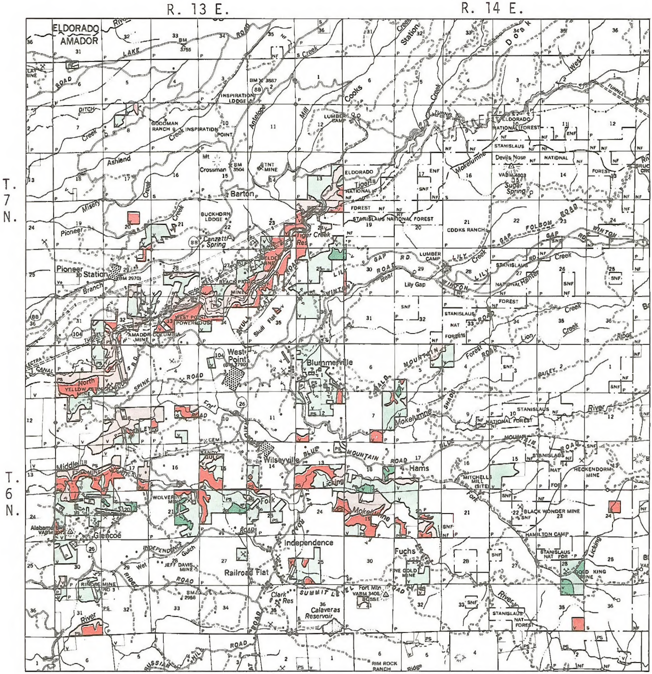
UNITED STATES DEPARTMENT OF THE INTERIOR

BUREAU OF LAND MANAGEMENT

CALIFORNIA DISTRICTS OF

BAKERSFIELD, SUSANVILLE, REDDING & FOLSOM

SUSTAINED YIELD UNIT 15



LEGEND

BLM COMMERCIAL FOREST LAND

AVAILABLE TIMBER PRODUCTION BASE
- 🟩 Intensive Timber Management Forest Land
- 🟩 Restricted Forest Land

🟥 Withdrawn Forest Land

⬜ BLM NON-COMMERCIAL FOREST LAND

N

SCALE: ½" = 1 Mile

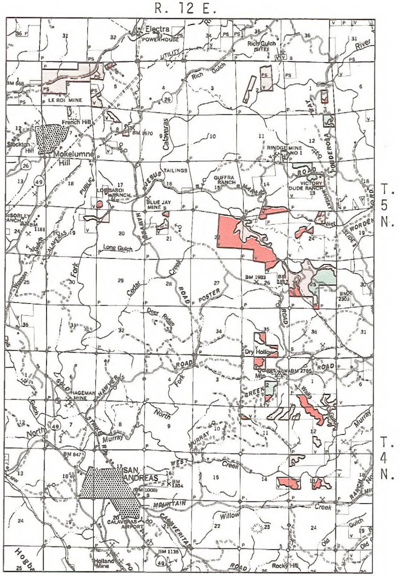
Mt. Diablo Base and Meridian

FOLSOM DISTRICT

Map 11 of 20 maps

UNITED STATES DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
CALIFORNIA DISTRICTS OF
BAKERSFIELD, SUSANVILLE, REDDING & FOLSOM

SUSTAINED YIELD UNIT 15



LEGEND

BLM COMMERCIAL FOREST LAND

AVAILABLE TIMBER PRODUCTION BASE
NONE Intensive Timber Management Forest Land
🟩 Restricted Forest Land
🟥 Withdrawn Forest Land

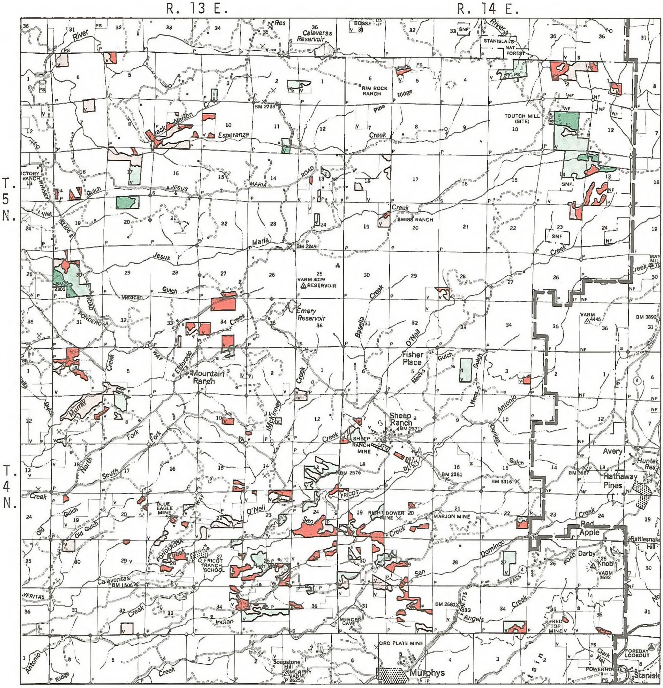
▨ BLM NON-COMMERCIAL FOREST LAND

SCALE: ½" = 1 Mile
Mt. Diablo Base and Meridian

FOLSOM DISTRICT
Map 12 of 20 maps

UNITED STATES DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
CALIFORNIA DISTRICTS OF
BAKERSFIELD, SUSANVILLE, REDDING & FOLSOM

SUSTAINED YIELD UNIT 15



LEGEND

BLM COMMERCIAL FOREST LAND

AVAILABLE TIMBER PRODUCTION BASE
- 🟩 Intensive Timber Management Forest Land
- ▨ Restricted Forest Land

🟥 Withdrawn Forest Land

⬜ BLM NON-COMMERCIAL FOREST LAND

N

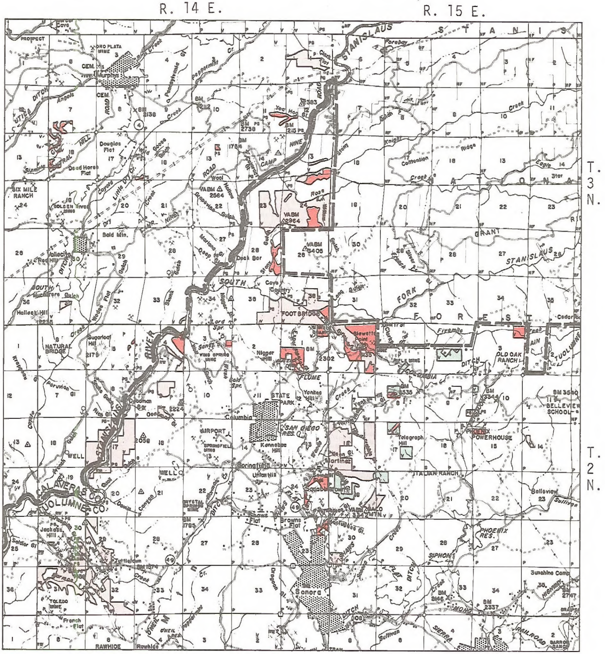
SCALE: ½" = 1 Mile

Mt. Diablo Base and Meridian

FOLSOM DISTRICT
Map 13 of 20 maps

UNITED STATES DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
CALIFORNIA DISTRICTS OF
BAKERSFIELD, SUSANVILLE, REDDING & FOLSOM

SUSTAINED YIELD UNIT 15



LEGEND

BLM COMMERCIAL FOREST LAND

AVAILABLE TIMBER PRODUCTION BASE
- NONE Intensive Timber Management Forest Land
- 🟩 Restricted Forest Land

🟥 Withdrawn Forest Land

☐ BLM NON-COMMERCIAL FOREST LAND

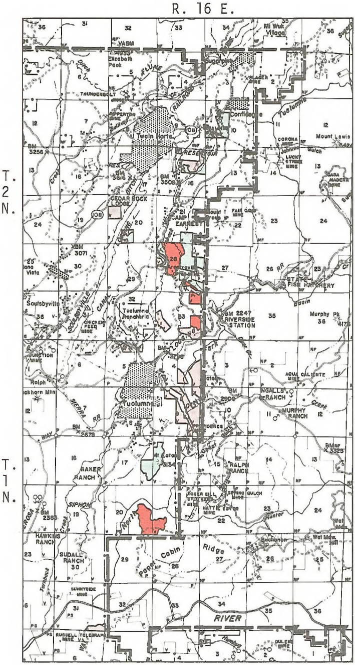
SCALE: ½" = 1 Mile

Mt. Diablo Base and Meridian

FOLSOM DISTRICT
Map 14 of 20 maps

UNITED STATES DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
CALIFORNIA DISTRICTS OF
BAKERSFIELD, SUSANVILLE, REDDING & FOLSOM

SUSTAINED YIELD UNIT 15



LEGEND

BLM COMMERCIAL FOREST LAND

AVAILABLE TIMBER PRODUCTION BASE
NONE Intensive Timber Management Forest Land
🟩 Restricted Forest Land

🟥 Withdrawn Forest Land

▨ BLM NON-COMMERCIAL FOREST LAND

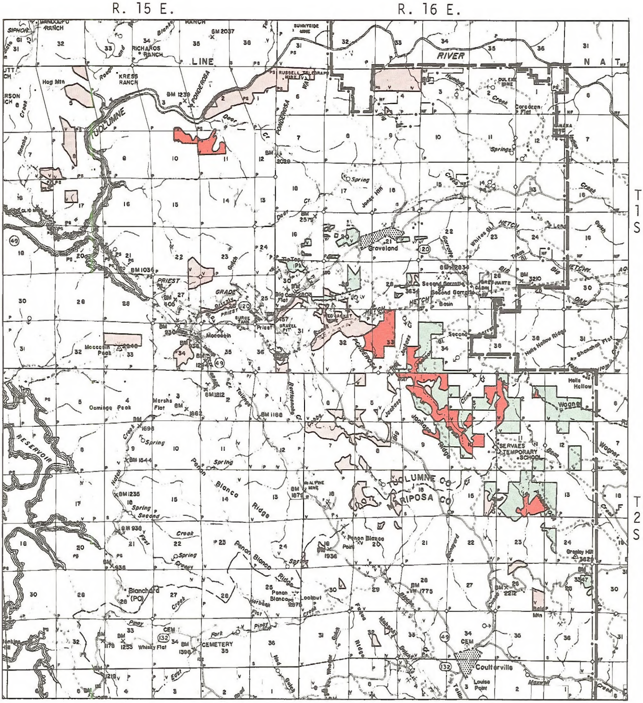
N

FOLSOM DISTRICT
Map 15 of 20 maps

SCALE: ½" = 1 Mile
Mt. Diablo Base and Meridian

UNITED STATES DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
CALIFORNIA DISTRICTS OF
BAKERSFIELD, SUSANVILLE, REDDING & FOLSOM

SUSTAINED YIELD UNIT 15



LEGEND

BLM COMMERCIAL FOREST LAND

AVAILABLE TIMBER PRODUCTION BASE
- NONE Intensive Timber Management Forest Land
- 🟩 Restricted Forest Land

🟥 Withdrawn Forest Land

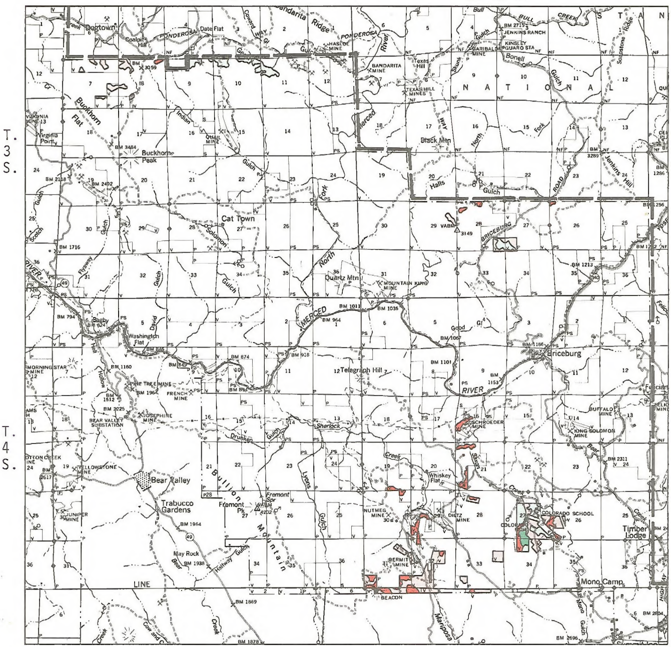
▨ BLM NON-COMMERCIAL FOREST LAND

SCALE: ½" = 1 Mile
Mt. Diablo Base and Meridian

FOLSOM DISTRICT
Map 16 of 20 maps

UNITED STATES DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
CALIFORNIA DISTRICTS OF
BAKERSFIELD, SUSANVILLE, REDDING & FOLSOM

SUSTAINED YIELD UNIT 15



LEGEND

BLM COMMERCIAL FOREST LAND

AVAILABLE TIMBER PRODUCTION BASE
- 🟩 Intensive Timber Management Forest Land
- ⬜ Restricted Forest Land

🟥 Withdrawn Forest Land

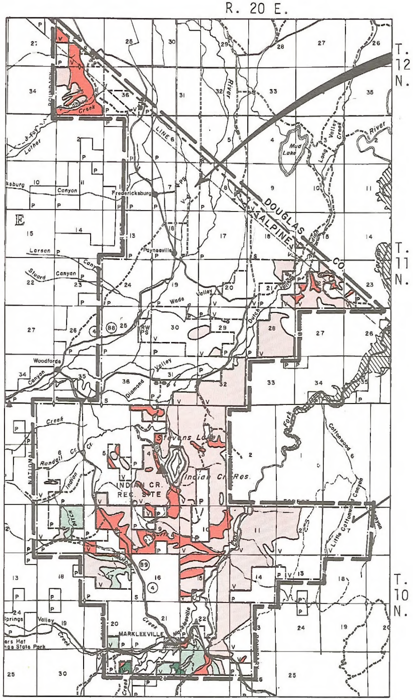
⬜ BLM NON-COMMERCIAL FOREST LAND

FOLSOM DISTRICT
Map 17 of 20 maps

SCALE: ½" = 1 Mile
Mt. Diablo Base and Meridian

UNITED STATES DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
CALIFORNIA DISTRICTS OF
BAKERSFIELD, SUSANVILLE, REDDING & FOLSOM

SUSTAINED YIELD UNIT 15



LEGEND

BLM COMMERCIAL FOREST LAND

AVAILABLE TIMBER PRODUCTION BASE
🟩 Intensive Timber Management Forest Land
🟩 Restricted Forest Land

🟥 Withdrawn Forest Land

▭ BLM NON-COMMERCIAL FOREST LAND

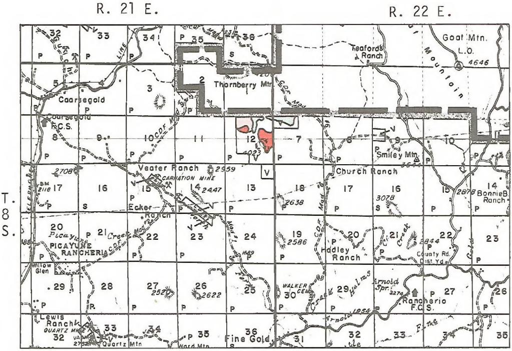
N

SCALE: ½" = 1 Mile
Mt. Diablo Base and Meridian

FOLSOM DISTRICT
Map 18 of 20 maps

UNITED STATES DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
CALIFORNIA DISTRICTS OF
BAKERSFIELD, SUSANVILLE, REDDING & FOLSOM

SUSTAINED YIELD UNIT 15



LEGEND

BLM COMMERCIAL FOREST LAND

AVAILABLE TIMBER PRODUCTION BASE
- NONE Intensive Timber Management Forest Land
- 🟩 Restricted Forest Land

🟥 Withdrawn Forest Land

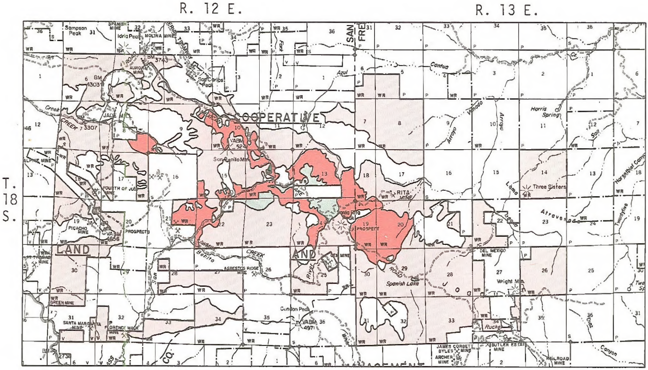
⬜ BLM NON-COMMERCIAL FOREST LAND

FOLSOM DISTRICT
Map 19 of 20 maps

SCALE: ½" = 1 Mile
Mt. Diablo Base and Meridian

UNITED STATES DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
CALIFORNIA DISTRICTS OF
BAKERSFIELD, SUSANVILLE, REDDING & FOLSOM

SUSTAINED YIELD UNIT 15



LEGEND

BLM COMMERCIAL FOREST LAND

AVAILABLE TIMBER PRODUCTION BASE
- 🟩 Intensive Timber Management Forest Land
- ▢ Restricted Forest Land

🟥 Withdrawn Forest Land

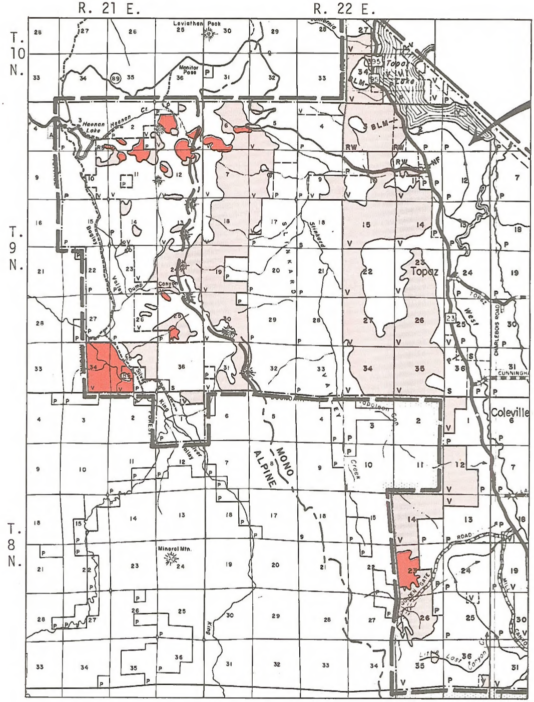
▢ BLM NON-COMMERCIAL FOREST LAND

SCALE: ½" = 1 Mile
Mt. Diablo Base and Meridian

FOLSOM DISTRICT
Map 20 of 20 maps

UNITED STATES DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
CALIFORNIA DISTRICTS OF
BAKERSFIELD, SUSANVILLE, REDDING & FOLSOM

SUSTAINED YIELD UNIT 15



LEGEND

BLM COMMERCIAL FOREST LAND

AVAILABLE TIMBER PRODUCTION BASE
NONE Intensive Timber Management Forest Land
NONE Restricted Forest Land

🟥 Withdrawn Forest Land

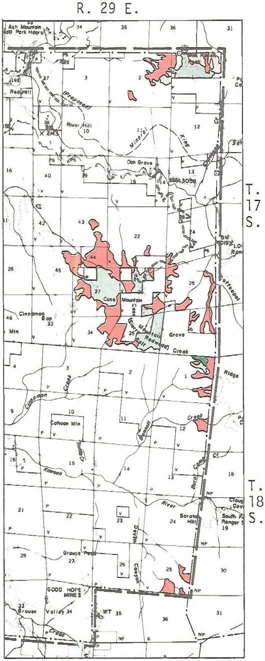
▨ BLM NON-COMMERCIAL FOREST LAND

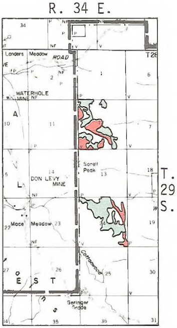
BAKERSFIELD DISTRICT
Map 1 of 2 maps

SCALE: ½" = 1 Mile
Mt. Diablo Base and Meridian

UNITED STATES DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
CALIFORNIA DISTRICTS OF
BAKERSFIELD, SUSANVILLE, REDDING & FOLSOM

SUSTAINED YIELD UNIT 15





LEGEND

BLM COMMERCIAL FOREST LAND

AVAILABLE TIMBER PRODUCTION BASE
- 🟩 Intensive Timber Management Forest Land
- ▨ Restricted Forest Land

🟥 Withdrawn Forest Land

☐ BLM NON-COMMERCIAL FOREST LAND

SCALE: ½" = 1 Mile
Mt. Diablo Base and Meridian

BAKERSFIELD DISTRICT
Map 2 of 2 maps

APPENDIX D

ALLOWABLE CUT DETERMINATION PROCESS

In determination of a sustained yeield allowable cut, generally the primary variables are acres allocated to timber production, applied management constraints, growth capability and enhancement of growth assumed from specific development practices or treatments. More specifically in SYU-15 the primary items controlling the potential harvest levels are: (1) the present volume of mature and overmate timber, (2) TPCC age class distribution, (3) policy constraint of evenflow, non-declining yield from the forest, and (4) the affects of controlling inferior hardwood and brush component of natural stands. Each alternative analysed in this EA contains a different mix of variable encompassing a range of choices of decision makers.

Following in chronological order are brief descriptions of the inventories and processes employed to determine the allowable cut level for each alternative including the proposed action.

Forest Inventories

The proposed timber management program is based on extensive and intensive inventory data collected in 1974 through 1978, respectively. During the extensive inventory, commercial timber stands on the unit were combined into broad strata for the statistical sampling phase of the project. These strata were designed to describe the condition and structure of the stands that prevail througout SYU-15. Tree height and stand density were major evalutation criteria.

These stratified sample points were statistically evaluated and approximately 10 percent were randomly selected for careful evaluation on the ground. For SYU-15, 164 plots were installed in forest types. This is a double sampling procedure consisting of (a) photo interpretation and (b) field plot installation. From this information a potential allowable cut was computed based on the physical characteristics of the forest land and the biological conditon of the timber resources.

The intensive inventory or Timber Production Capability Classification (TPCC), described in California State Manual Supplement 5250 and 5251, then partitioned all public land administered by BLM in SYU-15 (Folsom, Redding, Susanville, Bakersfield, and Carson City Districts) into categories or land use classes based on the land's physical and biological capacity to produce timber. TPCC's major classes are defined as follows:

Non-Forest Land - Areas within the forest zone that are not capable of being at least 10 percent stocked with forest trees (native woody plants that regularly attain a height of 20 feet or more) and those lands which have been converted to non-timber uses. Examples of non-forest lands are rock outcrops, urgan areas, resort areas, and roads. These lands are automatically excluded from the Timber Production Base.

Forest Land - Land which is now, or is capable of being at least 10 percent stocked by forest trees, and is not currently developed for non-timber use.

Non-Commercial Forest Land - Land which is not capable of yielding at least 20 cubic feet of wood per acre per year of commercial species, or land which is capable of producing only non-commercial tree species.

1. Low Site. A subclass of non-commercial forest land which is capable of supporting commercial species but is not capable of yielding at least 20 cubic feet of wood per acres per year of commercial species.

2. Non-Commercial Species. A subclass of non-commercial land on which only non-commercial tree species are capable of growing. Non-commercial species include all hardwoods, saleable or non-saleable.

Commercial Forest Land - All forest land that is capable of yielding at least 20 cubic feet of wood per acre per year of commercial coniferous tree species.

1. Non-Problem Sites. Commercial Forest Land that is not classified as Adverse Location, Fragile Site, or Problem Reforestation Area for reasons listed below.

2. Problem Sites. Subclass of commerical forest land which consists of (1) adverse location, (2) fragile areas, and (3) problem reforestation areas. This subclass of land is either withdrawn from planned management consideration of the Timber Production Base or is restricted from certain management or operational practices.

(a) Adverse Location. A subclass of problem sites which, because of its physical isolation, is difficult or impossible to manage for sustained yield timber production.

(b) Fragile Areas. A subclass of Problem Sites whose timber growing potential is easily reduced or destroyed. Loss of timber growing potential results from soil erosion and mass wasting.

(c) Problem Reforestation Areas. A subclass of problem sites where standard reforestation treatments are expected to result in an "understocked" condition after 5 Years.

The intensive timber inventory provides detailed land and timber management information to calculate an annual allowable harvest on a sustained yield basis. Maps in Appendix C show the location of BLM commercial forest lands, that is, land producing or capable of producing 20 cubic feet per acre per year of usable coniferous wood volume. Also shown are areas where reforestation would be a problem, sites which could be damaged through intensive management practices, low sites, and other adverse locations. These problem areas have either been withdrawn completely from the suitable timber production base or are restricted to certain management practices. The commercial forest land in SYU-15 determined to be problem areas include 105,397 acres. Of these, 50,565 acres were withdrawn completely from the suitable timber production base.

Other Resource Inventories

Inventories have been conducted to identify and categorize specific capability and potential of resources other than timber. Detailed soil surveys for Folsom District, as well as other major portions of SYU-15, have been completed by the Soil Conservation Service. Recreation planners have applied portions of the BLM's Recreation Information System, an inventory approach for determining inherent potential of the land to support various recreation activities. Visual and aesthetic considerations have been inventoried and classified for a number of planning units within the sustained yield unit. A review and compilation of known cultural resource data (Class I and II cultural resource inventory) is being compiled for the five districts. Wildlife biologists have inventoried portions of deer winter ranges and northern spotted owl and bald eagle nest sites. Some botanical surveys for threatened and endangered plants have been completed for special areas within the unit.

Land Use Allocation

The BLM's planning system is comprised of several components that are brought to focus in the resource management plan, which is called a Management Framework Plan (MFP). The MFP identifies management objectives, provides for land use allocations, and determines guidelines for mulitple use management.

MFP decisions are arrived at using an adversary concept for resolving various resource and land use conflicts. After identifying resources and opportunities based on inventory data presented in the Unit Resource Analysis (URA), BLM resource specialists make realistic recommendations maximizing their particular resource. These recommendations inevitably conflict on occasions and resolution has to occur. All potential conflicts and possible ways to resolve these conflicts are analyzed. Those alternatives that best resolve conflicts while maintaining optimum balance of quality and quantity of all resource values to meet expected needs are recommended.

BLM District Offices administering public lands within SYU-15 utilized this process during the conflict analysis stage of the MFP process. To overcome limitations of inadequate or outdated MFP's, plans were updated for over 30 planning units containing acres in the suitable timber production base. These updates, completed in June 1979, are available for review in appropriate District Offices. Table D-1 summarizes the conflicts related to timber management that were recognized during the planning process for the EA area, the recommendations made, and the resource trade-offs entailed.

The planning updates addressed the type and degree of restrictions placed on timber harvest operations. The type of restriction refers to the resource concern prompting timber harvest limitations. The degree of restrictions refers to an estimated percentage of reduction from the full potential harvest capability of the area (see Table D-2). The percentage estimates are based on judgments by Resource Area Managers and staff.

The blending of managerial considerations (constraints) developed in the MFP process with the forest acres identified in the TPCC inventory resulted in an available timber production base on which intensive forest management can be practiced and on which a realistic allowable cut can be based (see Glossary).

Allowable Cut Computation

Calculation and periodic adjustment of the allowable cut are done in accordance with BLM Manual 5240. Recalculation of the allowable cut is normally done every 10 years or more frequently in the event of a significant change in the forest condition, forest land base or in management objectives. The inventory data is processed by the BLM in the Denver Service Center using the SIMIX Forest Modeling System, a refinement and outgrowth of the SIMAC System developed cooperatively by the BLM and the U.S. Forest Service during the late 1960's and early 1970's. The SIMIX model simulates intensively managed forest properties using mixed harvest management systems under even-age, even-flow, production sustained-yield forestry concepts. This three-stage harvest considers: (1) initial cut (2) intermediate cut, and (3) final harvest. The model represents an all-age selection or continuous-canopy condition. Multiple use considerations are incorporated in the management regimes.

The following is a simplified explanation of the allowable cut calculations:

The projected trial harvest cut is removed from the growing stock base each decade. Growth, yields, and mortality are then projected into the next decade by stand, by age class, treatment category, and management regime. The growth, harvest and regeneration projections are carried out for 40 decades. If the trial cut can be maintained for this period without running out of timber available for cutting, a new trial run, using a higher harvest level is attempted.

Detailed reports of the allowable cut calculations for SYU-15 may be reviewed at the Folsom District Office. Management of the forest is projected into the future to reflect the effects on productivity due to a planned land use, multiple use impacts, and utilization practices as well as investments in intensive silvicultural practices (pre-commercial thinnings, commercial thinnings, reforestation, etc.) The projection period extends 40 decades into the future, not as an attempt to develop a 400 year forest management plan but rather to assure that the level of harvest can be maintained.

Table D-1

SUMMARY OF CONFLICTS, RECOMMENDATIONS AND TRADE OFFS

	Acres Affected by Conflict Resolution (Trade offs)		
Resource conflict - Management recomdations 1/	Acres of conflict where timber production is foregone to protect resource value	Acres of conflict where timber production is reduced to protect resource value	Acres of Conflict requiring special practices which do not affect timber production.
LANDS			
Right of Way - eliminate harvest unless compatible	401	2	14
Leases - eliminate harvest unless compatible	120	60	1
Communication sites - exclude harvest	7	--	--
Cemetery - exclude harvest	1	--	--
Other - (proposed boundary adjustments, exchanges, fuel breaks, etc.)	1,009	92	86
Case by case decisions			
MINERALS Exclude harvest where claimant retains surface management	21	--	--
WATERSHED Stream buffers - avoid excessive sedimentation and water temperature.	3891	500	462
Critical erosion - Avoid unacceptable levels of soil disturbance on fragile sites.	1533	220	806
Rare & endangered Plants - Give protection	--	--	15

Table D-1 (Cont)

SUMMARY OF CONFLICTS, RECOMMENDATIONS AND TRADE OFFS

Resource conflict - Management recommendations	Acres Affected by Conflict Resolution (Trade offs)		
	Acres of conflict where timber production is foregone to protect resource value	Acres of conflict where timber production is reduced to protect resource value	Acres of Conflict requiring special practices which do not affect timber production.
WILDLIFE			
Critical habitat - Protect or enhance critical wildlife habitat (Winter deer range, Bald Eagle nesting areas etc.)	169	1850	8
Rare & endangered Animals Protect habitat for rare and endangered wildlife species	--	498	--
RECREATION			
Camping - Protect existing and planned camping areas	190	--	16
Trails - Protect or restore trails during harvest	--	--	80
Visual resource - Protect or enhance visual resource	90	2868	774
Archaeology - Protect sites of national register quality	71	--	--
Historic - Protect sites by excluding harvest	12	--	--
Natural - Give appropriate protection	1152	59	163
TOTAL	3367	6090	2482

1/ More detailed recommendations for specific areas shown on the 1" = 1,000 ft. TPCC and Multiple use restriction maps are available for review at the District Offices.

Table D-2

SUMMARY OF PARTIAL MULTIPLE USE RESTRICTIONS

(Converted to percent of timber volume reduction
and to acres equivalent as if 100% restricted)
Example: 2 acres with a 50% volume restriction = 1.0 acre

Resource Value	Restricted Acres	Degree of Restriction	Acreage Conversion
LANDS			
Right of Way	2	50%	1.00
Lease	1	30%	0.30
Other	92	50%	46.00
WATERSHED			
Streamside buffer	16	10%	
	185	20%	
	299	30%	128.30
Erosion (Critical)	12	5%	
	51	20%	
	157	30%	57.90
WILDLIFE			
Habitat (Critical)	444	10%	
	4	15%	
	756	20%	
	646	25%	357.70
Rare & Endangered Animal Species	498	10%	49.80
RECREATION			
Visual Resource	85	5%	
	1127	10%	
	15	15%	
	1043	20%	
	598	30%	507.20
Natural Areas	27	20%	
	32	60%	24.60
TOTAL ACRES	6090	Av. 19.25%	1172.80

APPENDIX E

Table 1 - Native Wildlife Species Where Population Will Increase Because of an Abundant and Continuous Supply of Preferred Habitat (early successional stages)

SPECIES	SPECIES	SPECIES
REPTILES	BIRDS	BIRDS (Cont)
Western fence lizard	Turkey vulture	Logger-head shrike
Western Skink	Mountain quail	Orange-crowned warbler
Northern Alligator lizard	Great horned owl	Nashville warbler
MAMMALS	Common nighthawk	American goldfinch
Trowbridge shrew	Rufous hummingbird	Lesser goldfinch
Vagrant shrew	Dusky flycatcher	Rufous-sided towhee
Coyote	Steller's jay	Dark-eyed junco
California ground squirrel	Bushtit	White-crowned sparrow
Townsend chipmunk	Wrentit	Golden-crowned sparrow
Porcupine	Robin	Fox sparrow
Black-tailed deer	Townsend's solitaire	Song sparrow

APPENDIX E

Table 2 - Native Species Whose Populations Will Remain at About Existing Level

SPECIES

AMPHIANS

Tiger salamander
Long-toed salamander
Pacific treefrog 4/ 3/
Red-legged frog 4/ 3/
Western toad 1/**

REPTILES
Western pond turtle 1/
Western gartersnake 4/ 3/
Sharp-tailed snake 1/
Racer 1/**
Gopher snake 1/**
Ringnecked snake 1/**

MAMMALS
Shrewmole 4/ 3/
Raccoon 3/
Brush rabbit 3/
Long-tailed weasel 3/
Mink 3/
Snowshore hare 3/
Spotted skunk 4/
Red fox 4/ 1/**
Gray fox 4/ 1/
Bushy-tailed woodrat 4/
Mountain beaver 3/ 4/
California red-backed vole 3/ 4/
Long-tailed vole 3/
Muskrat 1/
Deer mouse 3/
River otter 1/
Striped skunk 1/
Mazama pocket gopher 1/**
Bobcat 3/

BIRDS
Common loon 1/
Eared grebe 1/
Western grebe 1/
Pied-billed grebe 1/
Whistling swan 1/

SPECIES

BIRDS (Cont.)

Snow goose 1/
Mallard 1/
Pintail 1/
Green-winged teal 1/
Cinnamon teal 1/
American widgeon 1/
Red-head 1/
Ring-necked duck 1/
Canvasback 1/
Lesser scaup 1/
Bufflehead 1/
Ruddy duck 1/
Common merganser 1/
Sharp-shinned hawk 4/
Cooper's hawk 4/
Red-tailed hawk 4/
Marsh hawk 1/**
Peregrine falcon 1/
Virginia rail 1/
Coot 1/
Semi-palmated plover 1/
Killdeer 1/**
Common snipe 1/
Willet 1/
Osprey 1/
Marbled godwit 1/
Sanderling 1/
Red phalarope 1/
Wilson's phalarope 1/
Northern phalarope 1/
Forester's tern 1/
Band-tailed pigeon 4/
Short-earled owl 1/
Belted kingfisher 2/
Western wood peewee 4/
Bank swallow 2/
Rough-winged swallow 2/
Barn swallow 2/
Cliff swallow 2/
Common raven 4/
Common crow 4/

Table 2 (Cont)

Canada goose 1/
Long-billed marsh wren 1/
Swainsons's thrush 4/
Water pipit 1/**
Yellow warbler 3/
Yellowthroat 3/
Red-winged black bird 1/
Lazuli bunting 3/
House finch 1/
Lincoln's sparrow 4/ 3/
Bald eagle 5/ **
Mourning dove 1/ **
Western meadowlark 1/ **
Vesper sparrow 1/ **

Dipper 1/
Varied thrush 4/
Golden-crowned kinglet 4/
Hutton's vireo 4/
Yellow-rumped warbler 3/
Yellow-breasted chat 3/
Brown-headed cowbird 1/**
Purple finch 4/
Pine siskin 4/ 3/
Golden eagle 5/
California quail 1/**
Scrub jay 1/ **
Savannah sparrow 1/ **
Horned Lark 1/ **

1/ Species basically dependent on non-forested habitats unaffected by timber management.

2/ Species not heavily dependent on any stage of plant succession.

3/ Species dependent on temporarily altered habitat.

4/ Species dependent on permantly altered habitat - silivculturally created habitat substituted for natural habitat.

5/ Adequate habitat provided to sustain existing population and allow for increase.

** These species are closely associated with meadow habitat, as well as the early stages of plant succession affected by intensive timber management (one exception is the Bald Eagle which depends on older forest vegetation). Impacts on these species would not be significant because meadow habitat will be maintained, and an adequate amount of older forest habitat for the Bald Eagle will be managed.

APPENDIX E

Table 3 - Degree of Effect on Representative Populations of Native Species (Adverse)

SPECIES	Habitats Eliminated or Reduced					
	Dead Defective Trees	Old Mature Conifer Stands	Deciduous Mixed Stands	Riparian	Vulnerability to Harassment	Degree of 1/ Impact
AMPHIBIANS						
Pacific giant salamander		X				M
Tailed-frog				X		M
REPTILES						
Gopher snake						L
Ringneck snake						L
Sharp-tailed snake						L
Racer	0					L
Rubber boa	0			0		L
MAMMALS						
Marsh shrew	0		X	0		M
Dusky Shrew	0		X	0		L
Big brown bat	X					M-H
Long-legged Myotis	X					M
Silver-haired bat	X					H
Black bear	0				Moderate	L
Fisher						VH
Marten	X					VH
Mountain Lion					High	M
Northern flying squirrel	X	X				M
Western gray squirrel	X					L
Red-tree mouse	0	X				VH
BIRDS						
Great blue heron		X		X	High	M-H
Green heron				X	Moderate	M
Black-crowned night heron				X	Moderate	M
Wood duck	X			X		VH
Hooded merganser	X			X		VH
Goshawk		X			High	H
Cooper's hawk	X		X			M
Marsh hawk						H
Rough-legged hawk						H
Killdeer						M
Blue grouse			X			M

APPENDIX E

Table 3 (Cont) - Degree of Effect on Representative Populations of Native Species (Adverse)

SPECIES	Habitats Eliminated or Reduced					
	Dead Defective Trees	Old Mature Conifer Stands	Deciduous Mixed Stands	Riparian	Vulnerability to Harassment	Degree of 1/ Impact
BIRDS (Cont)						
Ruffed grouse	0		X	0		H
Flammulated owl	X	X				H
Screech owl	X		X	0		VH
Pygmy owl	X					H
Spotted owl	X	X				VH
Saw-whet owl	X	0	0	0		H
Vaux's swift	X					H
Common flicker	X					H
White-headed woodpecker	X	X				VH
Pileated woodpecker	X	X				VH
Lewis woodpecker	X					VH
Yellow-bellied sapsucker	X		X	0		VH
Hairy woodpecker	X	0				VH
Downy woodpecker	X		X	0		VH
Hammond's flycatcher		X	X	0		H
Olive-sided flycatcher			X			H
Violet-green swallow	X					M-H
Tree swallow	X			0		H
Purple martin	X					H
Mountain chickadee	X	X				M
Chestnut-backed chickadee	X	X				H
White-breasted nuthatch	X		X			H
Red-breasted nuthatch	X	0				H
Brown creeper	X	0				H
House wren	X		X	0		H
Winter wren	X					H
Bewicks's wren	X		X	0		H
Hermit thrush		0				VH
Western bluebird	X					H
Ruby-crowned kinglet			X	0		H
Cedar waxwing			X	0		H

Table 3 (Cont) - Degree of Effect on Representative Populations of Native Species (Adverse)

	Habitats Eliminated or Reduced					
SPECIES	Dead Defective Trees	Old Mature Conifer Stands	Deciduous Mixed Stands	Riparian	Vulnerability to Harassment	Degree of 1/ Impact
BIRDS (Cont)						
Solitary vireo			X	0		H
Warbling vireo			X	0		H
Townsend's warbler		X				H
Hermit warbler		X				H
Black-throated gray warbler			X			VH
MacGillivray warbler			X			VH
Wilson's warbler			X	0		H
Black-headed grosbeak			X	0		H

1/ Explanation of symbols:

X = Major habitat alteration

0 = Minor habitat alteration

M = Light to moderate reduction in existing population levels are expected. Self-sustaining populations of these species are expected to persist throughout SYU-15.

H = High reductions in the existing populations are expected. Self-sustaining populations of these species are expected to persist unit-wide.

VH = Very high. These species have a high probability of being eliminated from SYU-15.

APPENDIX F

MAJOR PLANT SPECIES IN SYU-15 *
(by physiographic Region)

The following lists are very incomplete. They reflect the major trees and shrubs of the subject regions and give a representative sample of the herbaceous vegetation. A complete species list would have more than 1,000 species.

Inner North Coast Ranges

Common Name	Botanical Name
Trees	
Douglas-fir	*Pseudotsuga menziesii*
Ponderosa Pine	*Pinus ponderosa*
Black Oak	*Quercus kelloggii*
Madrone	*Arbutus menziesii*
Maul Oak	*Quercus chrysolepis*
Bigleaf Maple	*Acer macrophyllum*
Oregon White Oak	*Quercus garryana*
Shrubs	
Poison Oak	*Toxicodendron diversilobum*
Hazelnut	*Cornus cornuta*
Snowberry	*Symphoricarpos* spp.
Thimbleberry	*Rubus parviflorus*
Sweet Birch	*Ceanothus integerrimus*
Wild Rose	*Rosa* spp.
Huckleberry Oak	*Quercus vaccinifolius*
Graminoides	
Blue Wildrye	*Elymus glaucus*
California Needlegrass	*Stipa californica*
Western Fescue	*Festuca occidentalis*
Soft Chess	*Bromus mollis*
Cheatgrass	*B. tectorum*

* Listed in order of importance

Common Name	Botanical Name
Sixweeks Fescue	*Festuca octoflora*
Many Stemmed Sedge	*Carex multicaulis*
Forbs	
Miner's Lettuce	*Montia perfoliata*
Bedstraw	*Galium* spp.
Sweet Cicely	*Osmorhiza chilensis*
Japanese Hedge Parsley	*Torilis japonica*
Baby White Eyes	*Nemophila heterophylla*
Starflower	*Trientalis latifolia*
Star Solomon's Seal	*Smilacina stellata*
Southern Cascades	
Trees	
White Fir	*Abies concolor*
Red Fir	*A. magnifica*
Ponderosa Pine	*Pinus ponderosa*
Jeffrey Pine	*P. jeffreyi*
Lodgepole Pine	*P. murrayana*
Quaking Aspen	*Populus tremuloides*
Shrubs	
Gooseberry	*Ribes* spp.
Sierra Plum	*Prunus subcordata*
Snowbrush Ceanothus	*Ceanothus velutinus*
Whitethorn Ceanothus	*C. cordulatus*
Chinquapin	*Castanopsis sempervirens*
Pinemat Manzanita	*Arctostaphylos nevadensis*

Common Name	Botanical Name
Graminoides	
Squirreltail Grass	*Sitanion hystrix*
Many-stemmed Sedge	*Carex multicaulis*
Forbs	
Sweet Cicely	*Osmorhiza chilensis*
Wild Violet	*Viola* spp.
Woodland Star	*Lithophragma* sp.
Bleeding Heart	*Dicentra formosa*
Southeast Cascades - Sagebrush Ecotone	
Trees	
Jeffrey Pine	*Pinus jeffreyi*
Western Juniper	*Juniperus occidentalis*
Black Oak	*Quercus kelloggii*
Quaking Aspen	*Populus tremuloides*
Shrubs	
Big Sagebrush	*Artemisia tridentata*
Bitterbrush	*Purshia tridentata*
Mountain Mahogany	*Cercocarpus* sp.
Gooseberry	*Ribes* spp.
Rubber Rabbitbrush	*Chrysothamnus nauseosus*
Low Sagebrush	*Artemisia arbuscula*
Graminoides	
Idaho Fescue	*Festuca idahoensis*
Squirreltail Grass	*Sitanion hystrix*
Thurber's Needlegrass	*Stipa thurberiana*

Common Name	Botanical Name
Sandberg Bluegrass	*Poa secunda*
Kentucky Bluegrass	*P. pratensis*
Cheatgrass	*Bromus tectorum*
Forbs	
Kellogg's Spurred Lupine	*Lupinus* sp.
Spinsters Blue-eyed Mary	*Collinsia sparsifolia*
Wild Violet	*Viola* spp.
Single-stemmed Butterweed	*Senecio integerrimus*
Holboell's Rock-Cress	*Arabis holboellii*
Sandwort	*Arenaria* spp.
Locoweed	*Astragalus* spp.
Northern Sierra Nevada	
Trees	
Ponderosa Pine	*Pinus ponderosa*
Douglas-fir	*Pseudotsuga menziesii*
Incense-cedar	*Calocedrus (Libocedrus) decurrens*
Sugar Pine	*Pinus lambertiana*
Black Oak	*Quercus kelloggii*
Tanoak	*Lithocarpus densiflora*
Maul Oak	*Quercus chrysolepis*
Madrone	*Arbutus menziesii*
Yew	*Taxus brevifolia*
Shrubs	
Poison Oak	*Toxicodendron diversilobum*
Snowberry	Symphoricarpos *acutus*

Common Name	Botanical Name
Honeysuckle	*Lonicera involucrata*
Whiteleaf Manzanita	*Arctostaphlos viscida*
Sweet Birch	*Ceanothus integerrimus*
Sierra Gooseberry	*Ribes roezlii*
Hazelnut	*Corylus cornuta*
Buckbrush	*Ceanothus cuneatus*
Bear Clover (Mountain Misery)	*Chamaebatia foliolosa*
Graminoides	
Blue Wildrye	*Elymus glaucus*
Mountain Brome	*Bromus marginatus*
Big Squirreltail Grass	*Sitanion jubatum*
Western Fescue	*Festuca occidentalis*
California Needlegrass	*Stipa californica*
Soft Chess	*Bromus mollis*
Red Brome	*B. rubens*
Annual Fescue	*Festuca microstachys*
Forbs	
Hartweg's Wild Iris	*Iris hartwegii*
Blue-eyed Grass	*Sisyrinchium bellum*
Sticky Cinquefoil	*Potentilla glandulosa*
Miner's Lettuce	*Montia perfoliata*
Starflower	*Trientalis latifolia*
Star Solomon's Seal	*Smilacina stellata*
Giant Wake-robin	*Trillium chloropetalum*
Sweet Cicely	*Osmorhiza chilensis*

Common Name	Botanical Name
Southern Sierra Nevada (Douglas-fir Phase)	
Trees	
Douglas-fir	*Pseudotsuga menziesii*
Ponderosa Pine	*Pinus ponderosa*
Incense-cedar	*Calocedrus (Libocedrus) decurrens*
Sugar Pine	*Pinus lambertiana*
Yew	*Taxus brevifolia*
Maul Oak	*Quercus chrysolepis*
Black Oak	*Q. kelloggii*
Bigleaf Maple	*Acer macrophyllum*
Shrubs	
Poison Oak	*Toxicodendron diversiloba*
Hazelnut	*Corylus cornuta*
Sweet Birch	*Ceanothus integerrimus*
Honeysuckle	*Lonicera involucrata*
Sierra Gooseberry	*Ribes roezlii*
Graminoides	
Western Fescue	*Festuca occidentalis*
Mountain Brome	*Bromus marginatus*
Blue Wildrye	*Elymus glaucus*
Forbs	
Blue-eyed Grass	*Sisyrinchum bellum*
Star Solomon's Seal	*Smilacina stellata*
Starflower	*Trientalis latifolia*
Bedstraw	*Galium nuttallii*

Common Name	Botanical Name
Southern Sierra Nevada (Ponderosa Pine Phase)	
Trees	
Ponderosa Pine	*Pinus ponderosa*
Incense-Cedar	*Calocedrus (Libocedrus) decurrens*
Sugar Pine	*Pinus lambertiana*
Maul Oak	*Q. chrysolepis*
Black Oak	*Quercus kelloggii*
Giant Sequoia	*Sequoiadendron giganteum*
Shrubs	
Bear Clover	*Chamaebatia foliolosa*
Poison Oak	*Toxicodentron diversilobum*
Manzanita	*Arctostaphylos* spp.
Sweet Birch	*Ceanothus integerrimus*
Graminoides	
Blue Wildrye	*Elymus glaucus*
Mountain Brome	*Bromus carinatus*
Squirreltail grass	*Sitanion hystrix*
Red Brome	*Bromus rubens*
Soft Chess	*B. mollis*
Forbs	
Blue-eyed Grass	*Sisyrinchum bellum*
Vetch	*Vicia* spp.
Lotus	*Lotus* spp.

Common Name	Botanical Name
Central South Coast Range	
Trees	
Coulter Pine	*Pinus coulteri*
Jeffrey Pine	*P. jeffreyi*
Digger Pine	*P. sabiniana*
Incense-cedar	*Calocedrus decurrens*
Shrubs	
San Benito Manzanita	*Arctostaphylos benitoensis*
Glaucus Manzanita	*A. glauca*
Leather Oak	*Quercus durata*
Palmer Oak	*Q. dunnii*
Alvord Oak	*Q. alvordiana*
Graminoides	
Reed Grass	*Phragmites australis*
Big Squirreltail Grass	*Sitanion jubatum*
Mountain Brome	*Bromus marginatus*
Red Brome	*B. rubens*
Soft Chess	*B. mollis*
Forbs	
San Benito Mint	*Monardella benitensis*
Rayless Layia	*Layia discoidea*
San Benito Evening Primrose	*Camissionia benitensis*

APPENDIX G

THREATENED, ENDANGERED, AND RARE PLANTS OF SYU-15 REGION

Following is a list of threatened, endangered, and rare plants which are found, or could be expected to occur, on or near forested public lands within the SYU-15 study area.

The common names for these plants are poor at best. By definition a "rare" plant cannot have a "common" name.

The status of each species is designated according to definitions of the California Native Plants Society for rarity, endangerment, vigor, and general distribution.

Rarity (R)

1 = Rare, of limited distribution, but distributed widely enough that potential for extinction or extirpation is apparently low at present.

2 = Occurrence confined to several populations or one extended population.

3 = Occurs in such small numbers that it is seldom reported; or occurs in one or very few highly restricted populations.

P.E. = Possibly extinct or extirpated.

Endangerment (E)

1 = Not endangered.
2 = Endangered in part.
3 = Totally endangered.

Vigor (V)

1 = Stable or Increasing
2 = Declining.
3 = Approaching extinction or extirpation.

General Distribution (D)

1 = Not rare outside California.
2 = Rare outside California.
3 = Endemic to California.

Botanical Name	Common Name	R.	E.	V.	D.
Inner North Coast Range (No changes)					
Allium hoffmanii	Beegum onion	2	1	1	3
Arabis modesta	Modest rock-cress	2	1	1	2
Arabis serpenticola	Preston Peak rock-cress	3	1	1	3
Arenaria rosei	Rosy sandwort	2	2	2	3
Calochortus greenei	Greene's mariposa lily	2	1	1	2
C. persistens	Siskiyou mariposa lily	3	1	1	3
Campanula shetleri	Castle harebell	3	1	1	3
Castilleja elata	Slender indian paintbrush	2	2	1	2
Dicentra formosa ssp. oregona	Oregon bleeding heart	2	2	2	2
Epilobium niveum	Snow Mtn. fireweed	2	1	1	3
Eriastrum tracyi	Tracy eriastrum	3	2	2	3
Erigeron flexuosus	Trinity Alps daisy	2	1	2	3
Eriogonum libertini	Hoffman buckwheat	2	1	1	3
E. nervulosum	Snow Mtn. buckwheat	2	-	-	3
E. siskiyouense	Siskiyou buckwheat	2	1	1	3
E umbellatum var. humistratum		2	1	1	3
Frasera umpquaensis	Umpqua swertia	3	2	1	2
Galium serpenticum ssp. scotticum	Scott Mtn. bedstraw	2	1	1	3
Haplopappus ophitidis	Serpentine macronema	2	1	1	3
Ivesia pickeringii	Pickering's Ivesia	2	1	1	3
Lilium wigginsii	Wiggins's lily	2	1	1	3

Botanical Name	Common Name	R.	E.	V.	D.
Lomatium peckianum	Peck's lomatium	3	2	2	2
Lupinus antoninus	Anthony Peak lupine	3	1	1	3
L. tracyi	Tracy's lupine	2	2	1	3
Pedicularis Howellii	Howell lousewort	2	1	1	2
Penstemon filiformis	Thread-leaved penstemon	2	1	1	3
P. tracyi	Tracy penstemon	3	1	1	3
Phacelia dalesiana	Trinity phacelia	2	1	1	3
P. greenei	Scott Valley phacelia	3	1	1	3
Phlox hirsuta	Serpentine phlox	3	2	-	3
Raillardella pringlei	Showy raillardella	3	2	1	3
R. scabrida	Leafy raillardella	2	-	-	3
Sanicula tracyi	Tracy's sanicle	3	2	2	3
Schoenlirion bracteosum	Bracted schoenolirion P.E.	-	-	-	2
Silene marmorensis	Marble Mtn. catchfly	3	1	1	3
Stipa lemmonii var. pubescens	Crampton's needlegrass	3	3	2	2
Tauschia howellii	Howell's tauschia	3	2	2	2
Thelypodium brachycarpum	Short-podded thelypodium	2	2	1	2
Vaccinium coccinium	Siskiyou Mtns. blueberry	2	1	1	2
	Southern Cascade				
Cordylanthus tenuis ssp. pallescens	Pallid bird's beak	2	2	1	3
Lilium washingtonianum var. minus	Shasta lily	2	1	1	2
Limnanthes floccosa ssp. bellingeriana	Bellinger's meadowfoam	3	2	?	2

Botanical Name	Common Name	R.	E.	V.	D.
Penstemon cinicola	Ash penstemon	3	2	?	1
Pacelia cookei	Cooke's phacelia	3	2	2	3
Vaccinium coccinium	Siskiyou Mtns. Blueberry	2	1	1	2
Southern Cascade-Sagebrush					
Agastache parvifolia	Small leaved agastache	1	2	1	3
Arabis constancei	Constance Rockcress	3	1	1	3
Calochortus longbarbatus	Long-haird startulip	2	2	1	2
C. monanthus	Shasta River mariposa Lily P.E.	-	-	-	3
Cordylanthus capitatus	Yakima Bird's beak	3	1	1	1
Eriogonum procidum		2	2	1	2
Galium glabrescens ssp. Modocense	Modoc bedstraw	3	2	?	3
G. serpenticum ssp. Warnerense	Warner Mtn. bedstraw	1	2	2	3
Mimulus pygmaeus	Pygmy Monkey flower	3	2	2	2
Orthocarpus pachystachys	Shata owls clover P.E.	-	-	-	3
Thelypodium brachycarpum	Short-podded thelypodium	2	2	1	2
Northern Sierra Nevada					
Arabis constancei	Constance Rock-cress	3	2	2	3
Castilleja lassenensis	Lassen Indian paintbrush	2	1	1	3
Fritillaria eastwoodii	Greenhorn Fritillary	2	2	2	3
Githopsis latifolia	Lake Almanor blue-cup P.E.	-	-	-	3
Navarretia prolifera ssp. lutea	Yellow bur Navarretia	2	1	1	3
Penstemon personatus	Closed-lip penstemon	3	2	2	3
Perideridia bacigalupii	Rimo's perideridia	2	2	1	3
Silene invisa		1	2	2	3
Vaccinium coccinium	Siskiyou Mtns blueberry	2	1	1	2

Southern Sierra Nevada

Botanical Name	Common Name	R.	E.	V.	D.
Erythronium tuolumnense	Tuolumne Fawn Lily	1	2	1	3
Lupinus spectablis	Shaggy Hair Lupine	2	1	1	3
Perideridia bacigalupii	Rimo's Perideridia	2	2	1	3
Plagiobothrys distantiflorus	Popcorn Flower	2	1	1	3

Central South Coast Range

Camissonia benitensis	San Benito Evening Primrose	2	2	1	3
Layia discoida	Rayless Layia	2	2	1	3

APPENDIX H

ECONOMIC ANALYSIS

1. Objectives

The objectives of the economic analysis for the SYU-15 Environmental Assessment are to: (a) provide an economic return and ranking for each of the program alternatives by calculating revenue cost rates and present net worth at several rates of interest, (b) provide a way to examine the economic efficiency of different levels of management, (c) estimate first annual decade and annual costs of intensive management for the plan, and (d) provide an estimate of the effects on local economy and region associated with the program alternatives.

2. Assumptions

A. An evaluation of costs and revenues was made for Alternative 1 and 2 past the first decaade to show the economic effects of management systems leading up to the critical period. At the end of 90 years the decadal cut could be increased 53 percent to 182 million board feet with implementation of precommercial and commercial thinning treatments. Revenues would increase accordingly.

B. Actual costs from 1975-79 were added to projected costs and revenues for the remaining decades.

3. Inputs

The following cost estimates are based on FY 75-79 costs and as nearly as possible, direct project costs. Revenues are based on stumpage values for FY 79.

ITEM	REVENUE OR COST/UNIT
Stumpage Price	$132.08/MBF
Program Management (Fy 1975-79)	$38,604/MMBF
Site Preparation	
Herbicide Treatment	$87/acre
Clearing	$145/acre
Burning	$25/acre
Slash Disposal	
Mechanical	$50/acre
Lopping)	Reflected in
Burning)	stumpage price
Planning	$73.91/acre
Precommercial thinning	$127.40/acre

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